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DECEMBER 1989/JANUARY 1990
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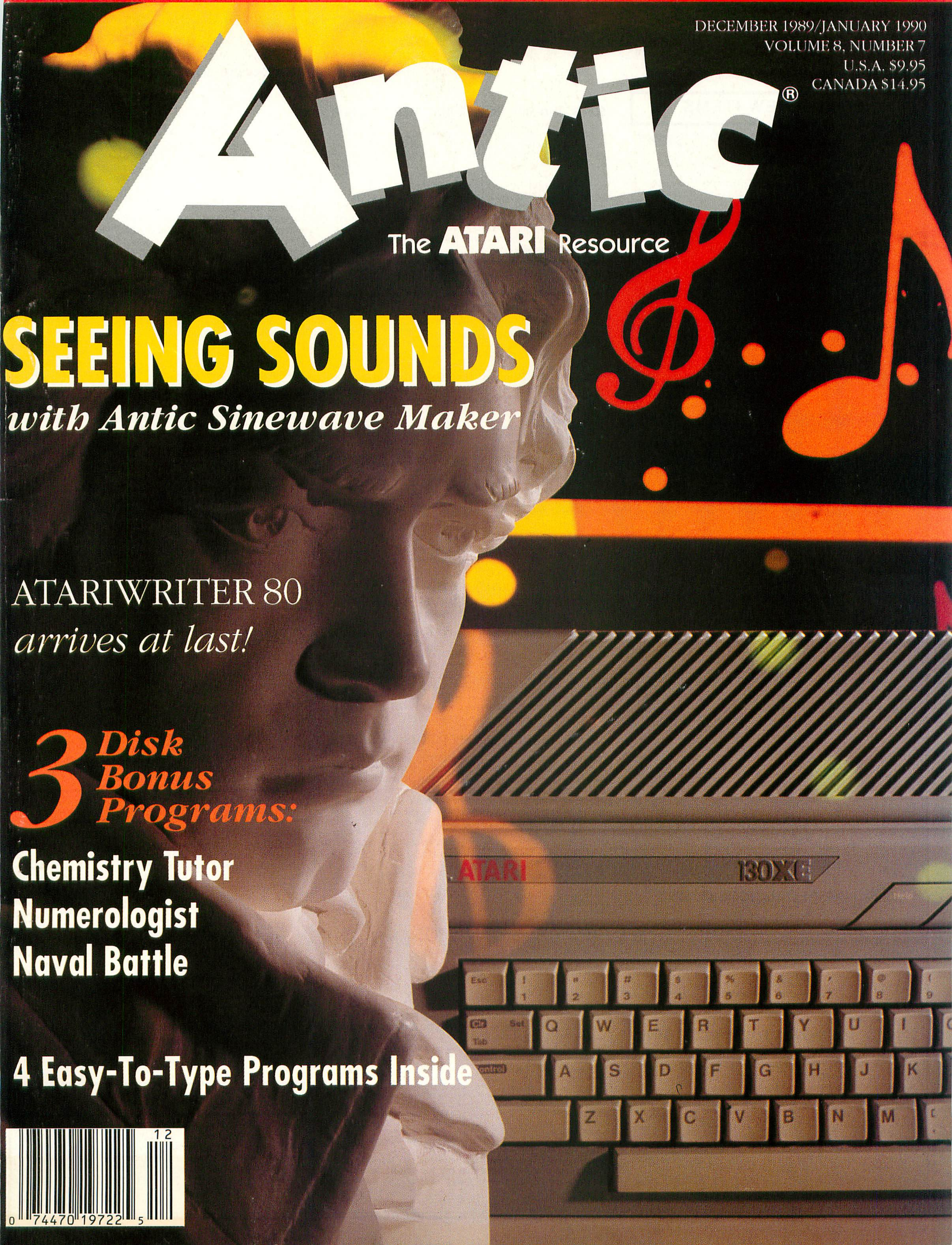
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ATARI

## BRAND NEW ITEMS

### $\$199^{95}$ The "BLACK BOX"!© $\$199^{95}$

The **Black Box** is a device for your XL or 130XE computer that adds tremendous power to your 8-bit Atari. It has two buttons, two switches, and a set of dip switches visible from the outside. It plugs directly into the back of the 600XL, 800XL, and 130XE computers. Custom cases may be an optional expense. The **Black Box** performs three main tasks: interface to a SASI/SCSI bus device (hard disks), Parallel printer port, and a RS232 port. A fourth option, available soon, will be a floppy disk port, especially useful to XF-551 owners. The SASI/SCSI port provides the necessary signals for hooking up most common hard disks. You may partition your hard disk into as many drives as you wish; up to 9 can be accessed at at time. By pressing one of the buttons on the **Black Box**, you will enter the configuration menu, where you can re-assign drive numbers, etc. When you exit, you will be right back in the program you were running when the switch was pressed. Each hard disk can be write-protected. The Parallel Printer port will allow you to hook up any printer that uses the standard Centronics interface. As an option, you can use the computer's extra memory as a printer buffer, or order the **Black Box** with 64K of on-board RAM. You may assign printer number and line-feed options within the menu (for use with multiple printers). Another amazing feature of the **Black Box** is the built-in screen dump. By pressing a button (on the box), the contents of your screen will be dumped to your printer (you can define text or graphics modes with a switch)! The RS232 port supplies the full RS232 spec signals for connection to a modem, or another machine (for null-modeming). The handler for the **Black Box**'s modem port is built in and takes up NO memory! The port handles rates up to TRUE 19.2K BAUD! A future upgrade for the **Black Box** is a floppy disk interface board. This will allow the addition of up to four 5.25" or 3.5" mixtures of floppy drives to be used with the system. The drives will act like standard single/enhanced/double density disk drives, but MUCH faster! All drives will be Super Archiver compatible, and support up to 2 sides of 80 tracks. Along with this hardware upgrade will come software capable of reading, writing, and formatting disks in IBM's MS-DOS format and the Atari ST format, and allow you to transfer files between those disk formats and the Atari's format. In addition, a machine language monitor has been added to allow memory disassembly, memory/register changes, and more. The Price of the **Black Box** is $199.95 for the basic unit and $249.95 with 64K of RAM (for printer spooler) plus $8 for S/H/I. An optional custom **BLACK BOX** case is available for $39.95 extra.

### $\$199^{95}$ The "MULTIPLEXER"!© $\$199^{95}$

This device brings the power and flexibility of larger systems to your 8-bit. The **Multiplexer** is a device (actually a collection of modules) that allow up to 8 Ataris to read and write to the same drive (typically a hard disk), printer, and talk to each other. One "master" computer (any 8-bit) is equipped with the master **Multiplexer** interface. Then up to 8 "slave" computers can hook up to the master, each having their own slave interface. The "common" peripherals (things that are to be shared) are connected to the master computer. On each slave, all disk and printer I/O is routed through the master, so no drives are needed on them. The master computer can be configured in any manner you wish - you can for example have certain peripherals "local" to the slave, or routed to a different number on the master. Under development is a BBS system that will make full use of this device, allow ing up to 8 lines/users to be using the system at the same time! A mutiuser chat mode is a feature of this program, however, you do not NEED this program to run a BBS with the **Multiplexer** (but be warned that not all BBS programs will run concurrently). All slaves are independent, and do not need to have the same program running on them. This system is excellent for BBS SysOps, because you can be using your hard disk(s) while still running your BBS uninterrupted! Another example is in a classroom situation, or anywhere a disk needs to be shared by different people. This is an EXCELLENT programming/debugging tool as well! The **Multiplexer** price is $199.95 for a master and two slave units (plus $5 S/H/I). Additional slave units are $69.95 each.

### $\$29^{95}$ "XF551 ENHANCER!"© $\$29^{95}$

The XF551 Atari drive is a fine product with one major flaw...It writes to side **TWO** of your floppy disks **BACKWARDS.** This causes read/write incompatibility problems with all other single sides drives made for Atari such as Indus, Trak, Rana, Percom, Astra, Atari 1050, Atari 810, etc. Add the **XF551 ENHANCER** to the new XF551 drive and your problems are over! This device will restore 100% compatibility while retaining original design qualities of Atari's super new drive. The **XF551 ENHANCER** is a **MUST** for all XF551 Owners. Installation is simple. Only $29.95 plus $4 S/H/I.

### $\$99^{95}$ The "POWER PLUS"!© MEMORY UPGRADE $\$99^{95}$

(for 800XL'S and 130XE's only)

C.S.S. has made the "**Power Plus**"! memory upgrades available on an "unadvertised" basis to our regular patrons. These upgrades have become so popular we are now making them available to everyone! For those of you unfamiliar with "**Power Plus**"! upgrade, it is the most COMPATABLE upgrade available for the 800XL or 130 XE. All other upgrade kits have some degree of INCOMPATABILITY with certain software programs. C.S.S. studied this problem and developed the **POWER PLUS** upgrade which, to the best of our knowledge, appears to be 100% compatible. To upgrade a 130XE to 320K is only $99.95. To upgrade an 800XL to 320K is only $149.95 (circuitry from a 130XE is actually transplanted into the 800XL). Add $5 for S/H/I. C.S.S. will install these upgrades for only $20 if you wish.

### $\$39^{95}$ The SIO "POWER BOOSTER"!© $\$39^{95}$

Weak data signals are often the problem of errors in data transmissions, especially when working in High or Ultra Speed modes! Long cables, modems, interfaces, and other devices that draw their power from the computer rather than having their own power supply often degrade the waveform of the signals between your computer and other peripherals, sometimes resulting in errors. The **SIO Power Booster Cable!** will amplify the signal to and from your computer 20 to 100 times providing perfect square-wave data transmissions regardless of peripherals used. The "**SIO Power Booster**" **Cable!** looks like a standard SIO cable and simply plugs into your computer! Only $39.95 plus $5 S/H/I.

## BEST SELLERS

### $\$69^{95}$ The "SUPER ARCHIVER"!© $\$69^{95}$
(for ATARI 1050 drives)

The new **SUPER ARCHIVER**, obsoletes all copying devices currently available for the **ATARI 1050**! It eliminates the need for Patches, **PDB** files, Computer Hardware, etc. Copies are exact duplicates of originals and will run on any drive; without exaggeration, the **SUPER ARCHIVER** is the most powerful **PROGRAMMING/COPYING** device available for the 1050! Installation consists of a plug-in chip and 6 simple solder connections. Software included. Features are:

- **TRUE DOUBLE DENSITY**
- **ULTRA-SPEED** read/write
- **FULLY AUTOMATIC COPYING**
- **SUPPORTS EXTRA MEMORY**
- **SCREEN DUMP** to printer
- **TOGGLE HEX/DEC DISPLAY**
- **SECTOR or TRACK TRACING**
- **AUTOMATIC DIAGNOSTICS**
- **DISPLAYS HIDDEN PROTECTION**
- **ADJUSTABLE/CUSTOM SKEWING**
- **AUTOMATIC SPEED COMPENSATION**
- **AUTOMATIC/PROGRAMMABLE**
- **PHANTOM SECTOR MAKER**
- **ARCHIVER/HAPPY ARCHIVER**
- **COMPATIBLE**
- **BUILT-IN EDITOR**-reads, writes, displays up to 35 sectors/track short
- **BUILT-IN CUSTOM FORMATTER** up to 40 sectors/track
- **BUILT-IN DISASSEMBLER**
- **BUILT-IN MAPPER**-up to 42 sectors/track
- **DISPLAYS/COPIES** Double Density **HEADERS**
- **AUTOMATIC FORMAT LENGTH CORRECTION**
- **SIMPLE INSTALLATION**

The SUPER ARCHIVER is so POWERFUL that only programs we know that can't becopied are the newer ELECTRONIC ARTS and SYNFILE/SYNCALC (34 FULLsectors/track). If you want it ALL...buy the "BIT-WRITER"! also... then you'll be able to copy even these programs! Only $69.95 plus $5 S/H/I.

JUST RELEASED

### $\$99^{95}$ The "SUPER ARCHIVER II"!© $\$99^{95}$
(for ATARI 1050 drives)

**NOW! COPIES** all **ENHANCED DENSITY** programs plus retains all of the features of our World Famous **SUPER ARCHIVER**! (see above). Allows you to **COPY** or **CREATE** single or **ENHANCED** density protection schemes (including **PHANTOM SECTORS**!). Completely automatic; compatible with the **BIT-WRITER I**; the **ULTIMATE BACKUP/PROGRAMMING** device! Only $99.95 plus $4 S/H/I. **NOTICE!** If you already own a **SUPER ARCHIVER**!, you can upgrade to a **SUPER ARCHIVER II** for only $29.95 plus $5 S/H/I (disk only-no additional hardware required).

### $\$69^{95}$ The "ULTRA SPEED PLUS"!© $\$69^{95}$

Imagine a universal XL/XE Operating System so easy to use that anyone can operate it instantly, yet so versatile and powerful that every Hacker, Programmer and Ramdisk owner will wonder how they ever got along without it! Ultra Speed Plus puts unbelievable speed and convenience at your fingertips. Use **ANY DOS** to place an **ULTRA SPEED** format on your disks, boot any drive (1-9) upon power-up, format your **RAMDISK** in Double Density, activate a built-in **400/800 OS** for software compatibility, plus dozens of other features too numerous to mention! Below are just a **FEW** features you'll find in the amazing OS:

- **ULTRA SPEED** SI0 for most modified drives
- **ULTRA SPEED** is toggleable
- Boot directly from **RAMDISK**
- Special timer circuits not required for 1 or 2 Meg upgrades
- Background colors adjustable
- Reverse use of **OPTION** key
- Cold-start without memory loss
- Built-in floppy/disk configuration editor (1-9)
- Built in **RAMDISK** configuration editor (1-9)
- **RAMDISK** exactly duplicates floppy drive so sector copying and sector editing are now possible
- Built-in MINI Sector Copier
- Toggle **SCREEN OFF** for up to 40% increase of processing speed
- Toggle internal **BASIC**
- Ram resident disk loader program (**MACH10** menu)
- **DOUBLE DENSITY RAMDISK** capable
- Entire **MEMORY** test that pinpoints defective **RAM** chip
- Boot any drive (1-9) upon power-up or cold-start
- Supports memory upgrades up to **TWO MEGABYTES**
- **THREE** Operating Systems in one (**XL/XE, 400/800, ULTRA SPEED PLUS**)

### $\$39^{95}$ The "RICHMANS"!© $\$39^{95}$
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Easy to use, very **powerful**, and **NO ADDITIONAL HARDWARE** required! Works with TV or Monitor! This "**DISK ONLY**" 80 Column Word-Processor is simple to use while offering numerous features such as:

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- Built-in Printer Drivers
- Page numbering
- Justify and Endfill
- High speed Cursor
- Spell Checker
- 80 COLUMNS ON THE SCREEN!
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- Search Mode
- View only mode
- Memory Statistics
- Alternate Output
- Change screen Colors, borders, luminesce
- Mouse compatible
- XEP-80 Compatible

One expert has compared **40 domestic and foreign word-processors and concluded that the RICHMANS 80 Column Word-Processor is the best!** Only $39.95 plus $5 S/H/I. (64K required).

### $\$79^{95}$ The "BIT-WRITER"!©

The Super Archiver "**BIT-WRITER**"! is capable of duplicating even the "uncopyable" EA and SYN series which employ 34 FULL sectors/track. The "**BIT-WRITER**"! is capable of reproducing these and **FUTURE** protection schemes of non-physically damaged disks. Simple installation... **PLUG-IN** circuit board and 4 simple solder connections. The "**SUPER ARCHIVER**" with the "**BIT-WRITER**"! is the ultimate **PROGRAMMING/COPYING** device for Atari 1050's. **EXACT DUPLICATES** of originals are made! Copies run an **ANY** drive. Must be used with Super Archiver. Only $79.95 plus $5 S/H/I.

### $\$39^{95}$ The "QUINTOPUS"!© $\$39^{95}$

The "**QUINTOPUS**"! is an inexpensive device that provides a tremendous amount of convenience while eliminating the problems associated with the endless "daisy-chaining" of peripherals (eg: drives, interfaces, printers, modems, cassettes, etc.). The "**QUINTOPUS**"! is an I/O port expander that converts a single I/O output/input into five additional outputs/inputs. Instead of daisy-chaining all your peripherals (which often times results in passing a signal through 30 feet or more of cable!), the "**QUINTOPUS**"! allows each device to be connected directly to the computers through only three or four feet of cable. This is particularly useful when attempting to use **ULTRASPEED** or **WARPSPEED** data transfer rates. The "**QUINTOPUS**"! also provides the "extra" I/O ports often needed to connect devices not having daisy-chaining capabilities. Cable resistance and compacitance are greatly reduced thereby significantly improving the opportunity of accurate data transfers! Only $39.95 plus $5 S/H/I. SIO cable is $5 extra if needed.

### $\$59^{95}$ The "QUINTOPUS"!© $\$59^{95}$
(with SWITCHABLE PORTS!)

This Deluxe version of the "**QUINTOPUS!**" has all of the above features with the additional benefits of two **SWITCHABLE PORTS!** This means you can connect two computers to one printer or two printers to one computer; you can switch in a computer/printer combination and while you're printing out a long document, switch in a second computer to access a modem, disk drive, cassette deck, etc! Switch multiple combinations of peripherals or computers without the hassle or re-arranging I/O cables...simply flip a switch! Only $59.95 plus $5 S/H/I. SIO cable is $5 extra if needed.

## HARD DRIVE SPECIALS

**COMPLETE** Hard Drive Systems from C.S.S. include the **BLACK BOX**, power supply, logic board, controller, DOS, cables and assorted software! All systems are wired, preformatted and have sample programs on them. Simply take it out of the box, plug it in and **BOOT**....no hassles! We currently stock 5 MEG to 80 MEG systems ranging from $495 to $895. Sizes range from 3 1/2 inch, 5 1/4 inch, to 8 inch industrial quality. Call!

Controllers available separately from Xebec, Adaptec, Seagate, Konan, and Western Digital. Call for pricing.

**SPECIAL-SPECIAL! 5 MEG REMOVABLE** disk Hard Drive — BRAND NEW — only $495 complete! Hard Drive sold separately in limited quantities for only $99.95. Excellent for backing up larger HD systems! (Original drive cost was $1100!)

## LIMITED SPECIALS

These specials are available on a first come first served basis. Pre-owned items are in exceptionally clean condition and are in perfect operating order. All items are warrantied. Sorry ... no rainchecks. Order 5 or more items and we'll pay the freight. These SPECIALS are for C.S.S. customers only - NO DEALER DISCOUNTS! Add $5 to order for S/H/I.

| | NORMALLY | LIMITED SPECIAL |
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| 1. 130XE with 320K POWER PLUS upgrade and Ultra Speed Plus installed (with power supply and cable) | | $ 250 |
| 2. 1050 DISK DRIVES with SUPER ARCHIVER II and SILENCER installed (with power supply and cable) | | $ 250 |
| 3. SUPER PILL (without case) | $ 80 | $ 22 |
| 4. ULTRA MENU/DOS | $ 30 | $ 19 |
| 5. DISKCRACKER (Newest version) | $ 50 | $ 19 |
| 6. ELECTRONIC PHANTOM SECTOR MAKER DELUXE | $ 60 | $ 35 |
| 7. IMPOSSIBLE for 800 or 800XL | $ 150 | $ 69 |
| 8. KLONE II (Generic HAPPY Backup) | $ 100 | $ 75 |
| 9. SILENCER | $ 30 | $ 19 |
| 10. BLACK PATCH (MASTER) | $ 50 | $ 25 |

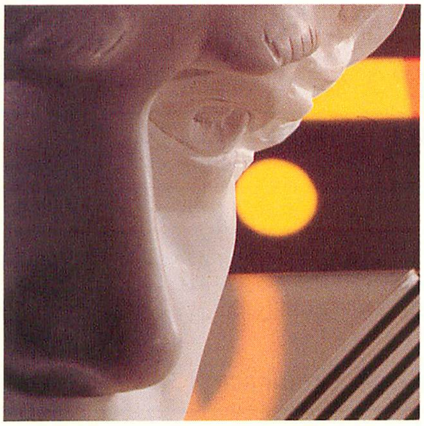
## REPAIRS

For 24-48 hour repair service on Atari computers or drives, call our repair department at (716) 586-5545 day or night. All work is guaranteed, NO minimum estimate fees; if you have two or more items for repair and don't want to spend any money .... send them to us and we'll use the parts from both defective items to make one good working unit at NO CHARGE ... we'll keep the other defective item for parts!

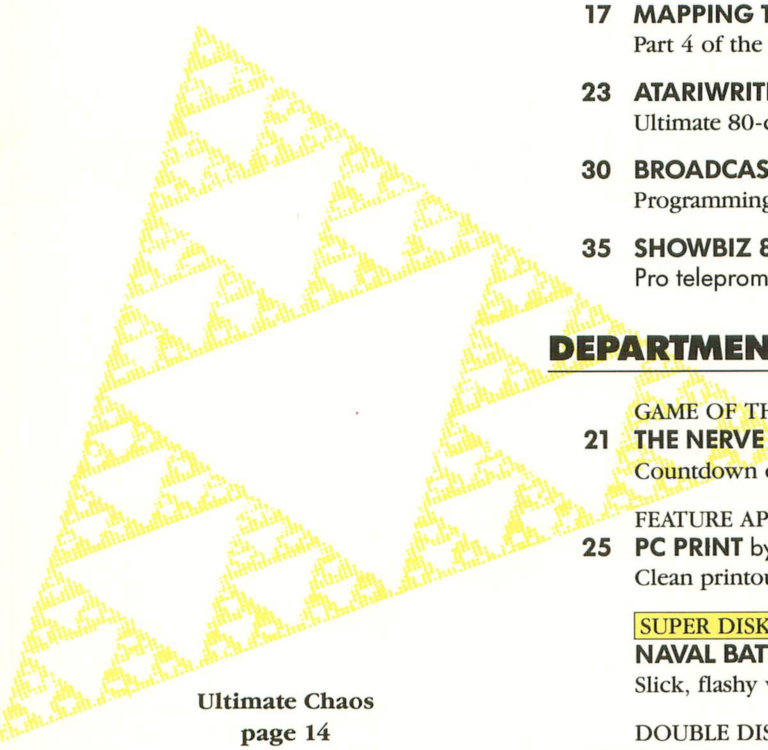
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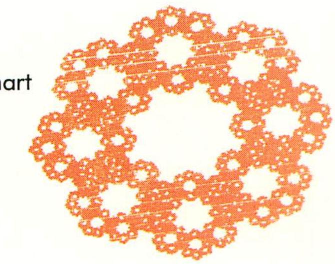
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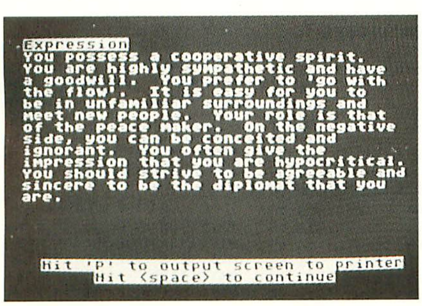


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## FEATURES



## DEPARTMENTS



## SOFTWARE LIBRARY 4 Easy-To-Type 8-Bit Listings



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| BASIC REV.A | 810 ROM C | POKEY |
| MPU 6507 | 800 ANTIC | PIA 6502 |
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| ASSEM REV.B | XE GATE ARRAY | XL ANTIC |
| VCS TIA 444 | BASIC REV C | 850 ROM B |
| FREDDIE | XL/XE OS | |

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| ATARI XF551 .............................. | 199.95 |
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| 1050 WITH HAPPY ENHANCEMENT ............ | 275.00 |
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## HAPPY ENHANCEMENT 810 OR 1050 $99.95
## 1050 SUPER ARCHIVER CHIP $69.95



**DE RE ATARI $10.00**

## ST INTEGRATED CIRCUITS

| | |
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Starting with the previous issue, **Antic** Magazine became a bi-monthly publication. It will now be published six times yearly, every other month.

Of course, **Antic** subscribers will continue receiving every issue they paid for. The only difference is that now **Antic** comes out every second month. At just $28 for a one-year subscription of six exclusive magazines-plus-disk, **Antic** remains one of the greatest bargains still available for 8-bit Atari users.

We regret that it was impossible to announce **Antic's** switch to bi-monthly publication in the previous issue, when it actually happened. The schedule changeover had to be decided quickly, while the October 1989 issue was already at the printer. There was only enough time to change the date to October/November 1989 on the front cover.

We have been very heartened by the support that **Antic** continues to receive from thousands of committed 8-bit Atari users like you (and a few dedicated advertisers too). Admittedly, lean times have fallen on the 8-bit Atari today—as well as on all other 64K-128K personal computers. Still, there's a core group of Atari enthusiasts who keep spending their money to continue getting the useful information and high-quality original software that **Antic** has provided for Atarians non-stop since 1982.

At this point, **Antic** has become a reader-supported magazine. (We're certainly not supported by advertising, backed by a big publishing conglomerate, or subsidized by Atari.) We actually consider ourselves to be in a partnership with our readers. Like us, your goal is to keep your Atari 8-bit as a workable computing tool for many more years. Together, **Antic** and you can do it.

*Nat Friedland*

Nat Friedland
Editor, **Antic**


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## BIKER DAVE BUMMER

*Biker Dave Atari,* the Super Disk Bonus in the September 1989 **Antic** under Erik Lowell's byline, actually was written by David Schwener and published in the November 1986 issue of COMPUTE! magazine. The two listings match exactly, except for authorship and magazine credits.

Perhaps Erik Lowell figured no one would remember or know where the program was originally published, since three years have elapsed since publication. Your article said that Lowell is a 14-year-old from Massachusetts "who is very interested in becoming a professional software developer." It saddens me to think that a young person would choose to obtain his first professional programming credit in such a callous way. I imagine his career will be very short if this trend continues.

Also, when *Biker Dave* was published in COMPUTE! it would not run on my 800. The display would jump and roll as soon as the play screen came up. The same problem occurs with the program on the Antic Monthly Disk. The fix is simple. Just make the following change:

```
2910 NEXT I:POKE DL+22,65
```

Darryl Howerton
Jonesboro, AR

Even the Display List error from the original *Biker Dave* is in your Super Disk Bonus. I fixed this problem for my own system back in 1986 by adding these lines:

```
2912 POKE DL+22,65
2913 POKE DL+23,32
2914 POKE DL+24,152
```

The game will run as is on some monitors or TV sets if you adjust the line frequency, but I had to correct the program for my monitor.

Doug Scott
Santa Clara, CA

Another note about the original *Biker Dave* is that the program will not work if you [BREAK] out of it and try to RUN it again. You should reboot your system and RUN the program again.

Mark Miller
Boulder, CO

*Many alert readers wrote or called right away to let us know about the problem of* Biker Dave *authorship—including longtime* ***Antic*** *contributor David Plotkin.*

***Antic*** *sincerely apologizes to COMPUTE! Magazine and to the rightful author of* Biker Dave *for having mistakenly reprinted their program. We would like to locate David Schwener so we can pay him the fee that Lowell was supposed to get.*

*Lowell has written to* ***Antic*** *that he programmed his own unique adaptation of* Biker Dave. *He enclosed an unreadable disk which was supposed to contain this new version. Lowell claims he just made a 'clerical error' by mistakenly submitting a disk file of Schwener's original game. However, Lowell's submission to* ***Antic*** *also included a printout of Schwener's program—with Lowell named as author.*

*We are grateful to all the* ***Antic*** *readers who spotted this unfortunate situation, including at deadline: John Andrews, Keith Brock, Fred Dormagen, Rodolfo Fong, Bruce Hathaway, Sylvia Jumaga, John Kells, John Langham, Phyllis Margaritas, Bruce Smith and Robert von Frisch.*

*The screen Flipping problem mentioned by several readers doesn't seem to happen on the monitors* ***Antic*** *uses, so we are passing along their suggested fixes without being able to check them fully.*—ANTIC ED

## ATARIWRITER HELP

In your July, 1989 I/O column, you told a reader to try using the Printer Driver Construction Set to solve his problems with AtariWriter subscripts on his Epson LX-80 printer. Unfortunately, the Printer Driver Construction Set was written before the LX-80 came out, and probably wouldn't solve the problem.

The best answer to this problem is to type:

[CONTROL-O]27S0o[CONTROL-O]27T

The [CONTROL-O] signifies one character made by pressing the [CONTROL] and [O] keys simultaneously. This character gives control from AtariWriter to the printer. 27 is the ESCAPE decimal code for the LX-80 printer, S0 turns on the superscript (S1 turns on subscript). The "o" was my superscript degree character—you would put your own superscript or subscript character here. Then the [CONTROL-O] accesses the printer again, and the 27T tells the printer to return to regular line spacing.

Of course, another solution would be to buy AtariWriter Plus, which has a Custom Printer Driver, and a lot more. Combined with the Epson manual, and a bit of trial and error, this will help much more than an outdated printer driver program.

Martha Guastella
Brookline, MA

## AMPLE CONFUSION

Back in your June 1989 issue, you talk about Antic Music Processor "Scott Joplin" music. Did I miss it, or didn't you put it on the disk?

Fred Portelli
Ocala, FL

*On the June, 1989 disk, the AMP files are: CASCADES, AUGUST, PRE20.JSB, SPRING, RHAP4, ROUND3, DYERMAKE, FIRST2, PICTURES4, MAJORGEN, CHEERS.AMP, FELON. On subsequent disks we made song files easier to identify by ending them all with .AMP. Rather than use the over-familiar Entertainer, we put two lesser-known Joplin tunes on the disk, the Augustan Club Waltz (AUGUST) and The Cascades. Another Joplin tune, Easy Winners (EASY.AMP) made it onto the July, 1989 disk, along with a rag, a boogie, and two other tunes. The August 1989 disk includes a minor upgrade to AMP (version 2.1) and three contemporary songs.*
—ANTIC ED

*Antic welcomes your feedback, but we regret that the large volume of mail makes it impossible for the Editors to reply to everyone. Although we do respond to as much reader correspondence as time permits, our highest priority must be to publish I/O answers to questions that are meaningful to a substantial number of readers.*
***Send letters to: Antic I/O Board, 544 Second Street, San Francisco, CA 94107.***

## TURBOFILE

(applications software)
MicroMiser Software
31413 Westward Ho
Sorrento, FL 32776
(904) 383-0745 (1-5 p.m., Eastern Time)
$49, XEP80 required

Want a simple 80-column database file manager with high capacity and speed, but without the complexity (and expense) of a full-fledged business database? **TurboFile** is MicroMiser's solution, using the Atari XEP80 controller. A companion program to MicroMiser's Turboword+, TurboFile can exchange files and information with the word processor for data input and mail merging. Reports can be formatted with columns and labels—and report formats can be saved.

Even more, TurboFile can import and convert DIF files (such as SynFile+ files)—and allows three times more storage per disk than SynFile. The database can be used with Atari DOS 2.5, SpartaDOS (with automatic subdirectories), MYDOS or DOS XL. The extensive manual provides plenty of documentation to go with the Quick Course instruction disk.

## RAMPACK

(utilities)
Helpways
P.O. Box H
Rochester, NY 14623
(716) 334-2928
$19.95

The **RAMPACK System** provides 12 different utilities on an autoboot disk, along with a special Help screen placed automatically into your RAMdisk. The utilities include an automatic MENU of disk directories, the RAMMAP display of your current memory limits, a DELETER for removing blocks of program lines, and FILECOPY. HEXDEC converts decimal numbers to hex and vice versa. COUNTBYT counts the bytes in any disk file, and SECTREAD shows you the contents of any disk sector. TYPERITE turns your keyboard and printer into an electronic typewriter, and PRNTFILE prints LISTed files directly from disk. DISKRITE writes to or appends from keyboard to disk files. READRITE offers speedy machine language/CIO read/write routines, ready to plug into your own programs.

You don't need a 130XE or DOS 2.5 to use RAMPACK. It runs on any 8-bit Atari with enough added memory to support a 24K RAMdisk, and works with just about any DOS compatible with DOS 2.0 or 2.5. If you don't have a RAMdisk, you can order **RAMPACK Jr.** ($16.95), the same unified system of 12 utilities, with the Help screen and manual on a separate disk.

## ALDS

(programming language)
Omicron Microsystems
P.O. Box 8553
Saskatoon, Sask., Canada S7K 6K6
(306) 955-7331
$22.45 U.S., $27.95 Canada, 48K disk

The **Assembly Language Development System** (ALDS) from Omicron Microsystems has an assembler featuring label-based assembly and will accept lowercase text and binary numbers, as well as decimal and hex. The translator converts source code files between different assembler formats, even adding or stripping line numbers where needed. The disassembler will disassemble object code from memory, disk files, or disk sectors in single or double density, with or without the three link bytes at the end of each sector. Sample files include the source code for the translator.

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# Antic Sound Creator

By Jeffrey Summers, MD

## You'll *see* why a violin sounds different from a clarinet.

**Sound waves move in strange and mysterious ways. If you ever wondered what makes a violin sound different from a clarinet, Antic Sound Creator will help you explore the wonders of harmonics. This simple, easy-to-use BASIC program works on 8-bit Atari computers with at least 48K memory and disk drive.**

Sitting on a park lawn listening to a band playing a free concert on a warm springtime day, I started thinking about what makes different instruments sound different. A trumpet and a flute, for example, may play the same note, yet they sound different.

The differences in sound character that distinguish one instrument from another are due to the presence of "harmonics" or overtones. To understand what these are and why they are important, think of a jumprope. It is easy to make a jumprope move up and down along its entire length. This we will call the primary wave.

With a little more energy and a flick of the wrist, it is possible for you to get the rope to vibrate in two halves—when one half of the rope is up, the other half is down, and vice versa. The center of the rope doesn't move in this situation. This we will call the secondary wave. If you are Hulk Hogan you can probably get the rope to further split into thirds or quarters, but it gets a lot more difficult.

Anyway, if you think of the primary wave as your first harmonic, then the secondary wave as the second harmonic and so on, you get the idea of what a harmonic is. When a violin string vibrates, the primary wave is produced by the entire length of string vibrating.

However, to a lesser extent the string also vibrates in halves, thirds, quarters, and so on. If you look closely at a vibrating violin string you can actually see points on the string where the vibrations decrease. (The harmonic point in the center of the string is usually the easiest to spot.) It is the relative contribution of these overtones that make the violin sound like a violin. A flute, playing the same note, will have different relative

amounts of the overtones or harmonics and therefore it sounds different from the violin.

## GETTING STARTED

To demonstrate this concept I wrote the Antic Sound Creator. This program allows you to create a sound wave either by drawing the wave freehand, or by adding overtones together, or by combining both methods. To use the program, type in Listing 1, check it with Typo II and be sure to SAVE a copy before you RUN it.

When the program starts, an x-axis and a y-axis are drawn in orange. Then a flat wave is drawn in green. The wave is flat because we haven't designed anything yet. A menu appears at the bottom of the screen. The options are to Add a Harmonic, Load and Save waves, Clear the wave, Quantize, Play, Draw, and Exit.

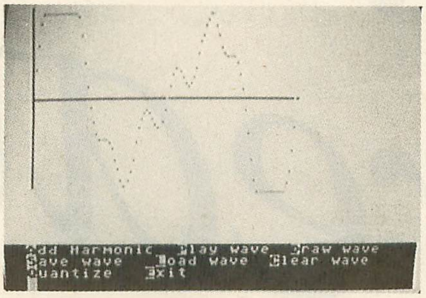
## MAKING WAVES

Adding a harmonic will add a sine wave to the current wave. You are first asked which harmonic you wish added. A pure sine wave whose length would fill the pattern would be harmonic number 1. A sine wave that would repeat once across the screen (two sine waves) would be 2, and so on. For our example, enter 1.

You are next asked for a scaling factor. This will govern the amplitude (loudness) of the wave being added. The value of the scaling factor can range from zero to a maximum of 1. Values above 1 will be cut off. It is difficult to add large-scaled harmonics together without such "clipping" (more on this later). For our example, enter .3.

The new wave is now drawn on the screen. To hear what this pure sine wave sounds like, press [P] to play the wave. You are then asked for a delay factor from 1 to 10. The number you enter will regulate the pitch of the tone. The values from 1 to 10 and their approximate pitches (very approximate in some cases) are shown in *Figure 1.* For our example, enter 3 for the delay. After a moment, the screen clears and you will hear the sound through your speaker.

Press any key to stop the sound and return to your screen. Next let's add an overtone. Type [A] to add another harmonic, and when you are asked which harmonic you wish to add,



*Antic Sound Creator*

type 2. For the scale, enter .3 again. The second wave is added to the first mathematically, and the resulting combined wave will be drawn. Press [P] to hear the new wave. See and hear the difference? Not much, with only one harmonic added, but you'll see more changes later.

*FIGURE 1*

| Delay Value | | Note |
|---|---|---|
| 1 | E | above high C |
| 2 | B | above middle C |
| 3 | A | flat above middle C |
| 4 | F | above middle C |
| 5 | E | flat above middle C |
| 6 | C | sharp (middle C) |
| 7 | B | below middle C |
| 8 | A | below middle C |
| 9 | G | below middle C |
| 10 | F | sharp below middle C |

## DRAWING WAVES

Now let's draw in a few changes to our wave. When you press [D], a cursor appears toward the bottom of the screen. The cursor is under the column you are working on. You may use the joystick or the [ARROW KEYS] (holding the [CONTROL] key is not necessary) to move the cursor sideways from column to column and up/down to change values. To exit the Draw mode, simply move the cursor all the way to the right, off the wave.

Using Draw mode, you can change the shape of the wave as you wish and hear the results. You can draw waves that would be nearly impossible to create from the addition of overtones, such as square waves and sawtooth patterns. To exit the draw mode simply move the cursor off the wave to the right.

The POKEY chip, which actually produces the sound we hear, only allows sixteen different values on the vertical y-axis of our graph. To get the most accuracy possible, the values for the wave are stored in the usual Atari floating point format. But when POKEY actually plays the wave it must be scaled to the range 0-15. Thus, if you make a very minor change to the wave on the screen, it may make no change at all to what you hear due to the limitations imposed by POKEY.

To see exactly what POKEY will play, you may press [Q] to quantize the wave. This converts the current wave into the actual wave POKEY will play. It usually isn't as pretty, and you can't un-quantize back to your original wave. So make sure you save your wave before you quantize, if you think you want to keep it and later modify it.

Pressing [S] allows you to save the wave you have been working on. You are prompted for a filename. If you don't enter a device, D: is assumed. The program will then save your data. Later, you may re-enter your data by using the [L] command and entering the same filename.

For the technically-minded who wish to create sounds not easily created by the addition on harmonics nor by freehand drawing, it would be easy to create a file compatible with this program. The files simply consist of a list of 100 numbers ranging from zero to sixteen, separated by [RETURN]s.

Thus, you can write a quick program to generate the file so you can graph and play such waves as

sin(x)(sin(4x)).

## CLIPPING PENALTIES

What happens when you add too many harmonics together and exceed the legal range of values of the program?

To see, use [C] to clear the current wave. Now press [A] to add a harmonic, enter a 1 for the harmonic, then enter .4. Play this with a delay of 5. The sound should be a nice pure sine wave.

Clear again and create a first harmonic wave with a scale of .8. Play this and aside from an increase in loudness the sound should be the same. Clear again and create a first harmonic wave with a scale of 1.5. Look at the wave on the screen. See how it looks clipped off on the top and bottom?

Now play this also with a delay of 5. The difference you hear is due to "clipping". Now when you buy stereo equipment you will know what the salesman means when he talks about speakers clipping when a certain volume is reached. Pressing [E] clears the screen and exits the program.

**You can change the shape of the wave as you wish and hear the results.**

## INSTRUMENTAL MIMICRY

Now that you know how the program works, let's try some different sounds. If you have a wave on the screen, press [C] to clear it. Press [A] to add a harmonic, and use the first harmonic with a scaling of .3. Next add harmonic number 2 with the same scaling of .3. Continue adding harmonics with values of 4, 8, and 16, all with scalings of .3.

Now play the wave. It sounds to me like an organ. Save this if you like, then use [C] to clear the wave. Now, add harmonics with values of 1, 3, 5, 7, and 9 all with scaling values of .3.

Play this, also with a delay of 5. It may not be Benny Goodman, but to me it sounds like a clarinet. ▲

*A physician from Rochester, NY, Jeffrey Summers is a frequent contributor to **Antic** and an 8-bit MIDI musician. His review of MIDIMAX appeared in the May 1989 **Antic**. His handy text-locating program Super Locator ran in the June 1989 issue.*

*Listing on page 42*

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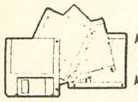
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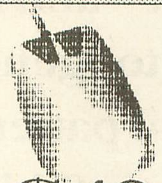
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# Ultimate CHAOS

*New fun with fractals.*

**By Roger Pruitt**

**Experiment with the new mathematics of chaos with this program that creates the Sierpinski gasket—and lets you add your own factors to generate some highly unusual fractal patterns. This BASIC program works on 8-bit Atari computers with at least 48K memory and disk drive. An Epson-compatible printer is optional.**

In physics and other sciences, the term "chaos" has come to mean the study of deterministic disorder. This is a relatively new field that integrates many subdisciplines of mathematics and the sciences. Chaos covers the study of fragmented and irregular fractal shapes such as clouds, mountains, coastlines, and tree bark, which all exhibit increasing detail when magnified.

In addition, chaos involves the study of non-linear dynamic systems exhibiting unpredictable and random behavior. Studies of biological populations, climate processes, economic fluctuations and the dynamics of Jupiter's Great Red Spot are all covered in the same discipline as studies of fractal shapes.

The word fractal was coined in 1975 by the mathematician Benoit Mandelbrot to describe his shapes, dimensions and geometry. The word itself is a contraction of "fractional dimensions," but most people think of fractals simply as shapes that are self-similar.

A coastline, for example, has a highly irregular fractal shape. As its structure is magnified, more of its irregularity is revealed, but the sort of shapes formed by the coastline remain the same, whether you are looking close up at a small inlet or from a satellite at a major bay.

In studying fractal shapes, a number of patterns have been identified. The Mandelbrot set, Koch curves and Sierpinski gaskets are some well-known examples of fractal shapes. (See Charles Jackson's excellent arti-

cle in the April 1986 **Antic** for more on fractals and the Mandelbrot set, also known as the Julia curve.) All these shapes result from deterministic processes.

To make a Koch snowflake curve, begin with an equilateral triangle. At the middle of each side, add a smaller triangle one-third the size of the original triangle. This results in a six-pointed figure. At the middle of each side of this figure add still smaller triangles, and so on.

To make a Sierpinski gasket, start with another equilateral triangle. Divide the triangle into four smaller triangles by drawing lines from the middle of each side to the other two sides. Remove the central triangle. Repeat the process with the remaining three triangles and remove the central triangle from each of them. Nine still smaller triangles remain. The process continues infinitely in the fractal, even if it becomes impossible to actually draw the ever smaller triangles with ordinary pencil and paper—or computer screen.

Rather than generate fractal shapes from such deterministic processes as just described, Michael Barnesley of the Georgia Institute of Technology takes a different approach. He constructs fractals through a random process he calls the Chaos Game.

## GETTING STARTED

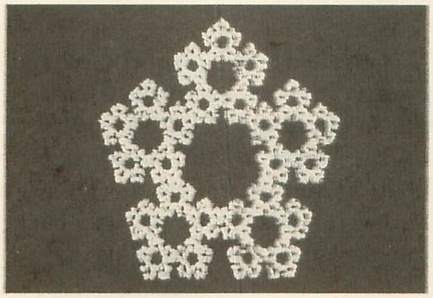
Listing 1, GASKET.BAS, is a short demonstration program. Type it in, check it with TYPO II and SAVE a copy to disk. Now type in Listing 2, CHAOS.BAS, check it with TYPO II, and SAVE a copy to disk. Antic Disk users will find both of these programs on this issue's disk.

If you have trouble typing Listing 2 because of the special characters in lines 28360, 28370, 28400 and 28410, don't type them in. Listing 3 will create these hard-to-type lines for you. Type in Listing 3, check it with TYPO II, and SAVE a copy.

When you RUN Listing 3 it will create a file containing these hard-to-type lines called LINES.LST. (Make sure you don't already have a file by that name on your disk.) Merge this file into Listing 2 by typing LOAD "D:CHAOS.BAS" and then ENTER "D:LINES.LST". Be sure to SAVE the final version of the Ultimate Chaos file.

## SIERPINSKI GASKET

When you RUN the shorter demonstration program GASKET.BAS (Listing 1) by itself, it generates a Sierpinski gasket according to Barnesley's method. You'll see the distinctive triangular patterns generating in about five or 10 minutes. In the program, the vertices (points) of a triangle are located at the screen coordinates (0,0), (318,0) and (159,191). These vertices are respectively designated as 1, 2 and 3.



*Polygon generated with Ultimate Chaos*

First the computer randomly picks a point anywhere on the screen. Next, one of the vertices is randomly chosen. A point is then plotted (drawn) halfway between the initial point and this vertex. From this point a second point is plotted halfway to the next randomly chosen vertex. The process is repeated over and over.

At first, the process appears to randomly place dots all over the screen. However, after a short period of time the pattern of the Sierpinski gasket begins to emerge. It is fascinating to watch order appear from chaos.

Instead of dividing the distance from the last plotted point to a randomly chosen vertex by two, I wanted to see what would happen if the distance were divided by three, or something else. Then I wondered what kind of fractal patterns would be generated for polygons of more than three sides. After a little thinking I realized I could write a general program that would let me study all the variations. The resulting program is Ultimate Chaos.

When you RUN Ultimate Chaos, you will see two Menu items on the screen. With option 1, Create Chaos, you can generate fractal patterns for polygons with up to 10 sides, using different scale factors to determine where points will be plotted. First, you will be asked to enter a name for your picture—to be used as a filename if you choose to save your fractal image later. Enter a name with up to eight characters and press [RETURN]. The program will automatically supply .PIC as the file name extension when you are ready to save the picture to disk.

You will next be asked to input the number of sides your polygon should have. You can enter any number from 1 through 10, including fractions (in decimal form). A triangle is a three-sided polygon. If you enter 3 for the number of sides, then at the next prompt enter a scale of 0.5 (one half). With this scale the distance between the last plotted point and a randomly chosen vertex is halved and a new point is plotted on the screen. The result should be a Sierpinski gasket very similar to the ones produced with GASKET.BAS.

Other scale factors cause new points to be plotted closer or further from the vertices—the smaller the scale factor, the closer the points will be to the vertices. A scale of .333 (one third) results in smaller triangles clustered at each vertex. With scales over .5, points begin to overlap, gradually filling in some polygons. A scale of 1 will result in all new points being plotted precisely on top of the old one.

For a truly odd shape, a scale of .99 produces a crawling line that eventually reaches the center of the polygon

and stays there, moving slightly back and forth between the randomly-chosen vertices.

Experimentation will show that different scale factors work better with different polygons. A scale factor of 0.4 works well for a five-sided pentagon, while smaller scale factors produce nice results for polygons of more sides. Further interesting patterns result from choosing a non-integer value when the prompt asks for the number of sides for the desired polygon. For example, you might try a 2.5 sided polygon with a scale factor of 0.3.

### SAVE & PRINT

Once you have a fractal pattern you like, you can save it simply by pressing [SELECT]. You will need to have plenty of free space on your disk, as each picture is saved in Micro-Painter format requiring 62 sectors. (Micro-Painter images may be converted to Micro Illustrator format with *Rapid Graphics Converter* from the November 1985 Antic.)

**It is fascinating to watch order appear from chaos.**

If you have an Epson-compatible printer, you can also print your picture by pressing [OPTION]. To return to the main menu, hold down [START] and then press [OPTION].

You can load your pictures back into the Chaos Game by using option 2 on the main menu, Load Picture. Make sure you know the name of the picture you want *before* you choose this option. The program will add the extender .PIC to the filename for you, and load the picture from the disk in drive one.

For more information on fractal geometry and the Chaos Game, "Chaos: Making a New Science". by James Gleick (Viking, 1987, ISBN 0-670-81178-5) is an excellent introduction to chaotic phenomena, even for non-mathematicians.

*Roger Pruitt is a Professor of Physics at Fort Hays State University in Hays, KS. His physics department has eight Atari 8-bit computers for student use, six of them networked with a Supra MicroNet and MicroStuffer, and interfaced with various laboratory detectors for data collection and reduction.*

*Listing on page 38*

# Mapping the Atari

PART 4

Exclusive!

## Classic 8-bit reference book returns.

By Ian Chadwick

***Antic* continues the exclusive serialization of key excerpts from the revised second edition of Ian Chadwick's "Mapping the Atari." Virtually impossible to obtain today, this book has been one of the key reference sources for intermediate and advanced Atari 8-bit programmers since 1983.**

**This exclusive *Antic* serialization began in the August 1989 issue, with an explanation of how to use the memory map locations presented in each successive issue.**

Locations 512 to 1151 ($200 to $47F) are used by the OS for working variables, tables and data buffers. In this area, locations 512 to 553 ($200 to $229) are used for interrupt vectors, and locations 554 to 623 ($22A to $26F) are for miscellaneous use. Much of pages two through five cannot be used except by the OS unless specifically noted. A number of bytes are marked as 'spare', i.e., not in use currently. The status of these bytes may change with an Atari upgrade, so their use is not recommended.

There are two types of interrupts: Non-Maskable Interrupts (NMI) processed by the ANTIC chip and Interrupt Requests (IRQ) processed by the POKEY and the PIA chips. NMI's are for the VBLANK interrupts (VBI's; 546 to 549, $222 to $225), display list interrupts (DLI) and RESET key interrupts. They initiate the stage one and stage two VBLANK procedures; usually vectored through an OS service routine, they can be vectored to point to a user routine. IRQ's are for the timer interrupts, peripheral and serial bus interrupts, BREAK and other key interrupts, and 6502 BRK instruction interrupts. They can usually be used to vector to user routines. See NMIST 54287 ($D40F) and IRQEN 53774 ($D20E) for more information. NMI interrupt vectors are marked NMI; IRQ interrupt vectors are marked IRQ.

| | | |
|---|---|---|
| 512,513 | 200,201 | VDSLST |

The vector for NMI Display List Interrupts (DLI): containing the address of the instructions to be executed during a DLI (DLI's are used to interrupt the processor flow for a few microseconds at the particular screen display line where the bit was set, allowing you to do another short routine such

as music, changing graphics modes, etc.). The OS doesn't use DLI's; they must be user-enabled, written and vectored through here. The NMI status register at 54287 ($D40F) first tests to see if an interrupt was caused by a DLI and, if so, jumps through VDSLST to the routine written by the user. DLI's are disabled on powerup, but VBI's are enabled (see 546 to 549; $222 to $225).

VDSLST is initialized to point to 59315 ($E7B3), which is merely an RTI instruction. To enable DLI's, you must first POKE 54286 ($D40E) with 192 ($C0); otherwise, ANTIC will ignore your request. You then POKE 512 and 513 with the address (LSB/MSB) of the first assembly language routine to execute during the DLI. You must then set BIT 7 of the Display List instruction(s) where the DLI is to occur. You have only between 14 and 61 machine cycles available for your DLI, depending on your GRAPHICS mode. You must first push any 6502 registers onto the stack, and you must end your DLI with an RTI instruction. Because you are dealing with machine language for your DLI, you can POKE directly into the hardware registers you plan to change.

514,515 202,203 VPRCED

Serial (peripheral) proceed line vector, initialized to 59314 ($E7B2), which is merely a PLA, RTI instruction sequence. It is used when an IRQ interrupt occurs due to the serial I/O bus proceed line which is available for peripheral use.

516,517 204,205 VINTER

Serial (peripheral) interrupt vector, initialized to 59314 ($E7B2). Used for the IRQ interrupt due to a serial bus I/O interrupt.

518,519 206,207 VBREAK

Software break instruction vector for the 6502 BRK ($00) command (not the BREAK key, which is at location 17; $11), initialized to 59314 ($E7B2). This vector is normally used for setting break points in an assembly language debug operation. IRQ.

520,521 208,209 VKEYBD

POKEY keyboard interrupt vector, used for an interrupt generated when any keyboard key is pressed other than BREAK or the console buttons. Console buttons never generate an interrupt unless one is specifically user-written. VKEYBD can be used to process the key code before it undergoes conversion to ATASCII form. Initialized to 65470 ($FFBE), which is the OS keyboard IRQ routine.

522,523 20A,20B VSERIN

POKEY serial I/O bus receive data ready interrupt vector, initialized to 60177 ($EB11), which is the OS code to place a byte from the serial input port into a buffer. Called INTRVEC by DOS, it is used as an interrupt vector location for an SIO patch. DOS changes this vector to 6691 ($1A23), the start of the DOS interrupt ready service routine. IRQ.

524,525 20C,20D VSEROR

POKEY serial I/O transmit ready interrupt vector, initialized to 60048 (EA90), which is the OS code to provide the next byte in a buffer to the serial output port. DOS changes this vector to 6630 ($19E6), the start of the DOS output needed interrupt routine. IRQ.

526,527 20E,20F VSEROC

POKEY serial bus transmit complete interrupt vector, initialized to 60113 ($EAD1), which sets a transmission done flag after the checksum byte is sent. IRQ.

528,529 210,211 VTIMR1

POKEY timer one interrupt vector, initialized to 59314 ($E7B2), which is a PLA, RTI instruction sequence. Timer interrupts are established when the POKEY timer AUDF1 (53760; $D200) counts down to zero. Values in the AUDF registers are loaded into STIMER at 53769 ($D209). IRQ.

530,531 212,213 VTIMR2

POKEY timer two vector for AUDF2 (53762, $D202), initialized to 59314 ($E7B2). IRQ.

532,533 214,215 VTIMR4

POKEY timer four vector for AUDF4 (53766, $D206), initialized to 59314 ($E7B2). This IRQ is only vectored in the 'B' version of the OS ROMs.

534,535 216,217 VIMIRQ

The IRQ immediate vector (general). Initialized to 59126 ($E6F6). JMP through here to determine cause of the IRQ interrupt. Note that with the new ('B') OS ROMs, there is a BREAK key interrupt vector at locations 566,567 ($236, $237).

The locations from 536 to 558 ($218 to $22E) are used for the system software timers. Hardware timers are located in the POKEY chip and use the AUDF registers. These timers count backwards every 1/60 second (stage one VBLANK) or 1/30 second (stage two VBLANK) interval until they reach zero. If the VBLANK process is disabled or intercepted, the timers will not be updated. These locations are user-accessible and can be made to count time for music duration, game I/O, game clock and other functions.

Software timers are used for durations grater than one VBLANK interval (1/60 second). For periods of shorter duration, use the hardware registers.

536,537 218,219 CDTMV1

System timer one value. Counts backwards from 255. This SIO timer is decremented every stage one VBLANK. When it reaches zero, it sets a flag to jump (JSR) through the address stored in locations 550,551 ($226, $227). Only the realtime clock (locations 18-20; $12-14), timer one, and the attract mode register (77; $4D) are updated when the VBLANK routine is cut short because time-critical code (location 66; $42 set to non-zero for critical code) is executed by the OS.

538,539 21A,21B CDTMV2

System timer two. Decremented at the stage two VBLANK. Can be decremented every stage one VBLANK, subject to critical section test as defined by setting of CRITIC flag (location 66; $42). This timer may miss (skip) a count when time-critical code (CRITIC equals non-zero) is being executed. It performs a JSR through location 552, 553 ($228, $229) when the value counts down to zero.

540,541 21C,21D CDTMV3

System timer three. Same as 538. Timers three, four, and five are stopped when the OS sets the CRITIC flag to non-zero as well. The OS uses timer three to OPEN the cassette recorder and to set the length of time to read and write tape headers.

542,543 21E,21F CDTMV4

System timer four. Same as 538 ($21A).

544,545 220,221 CDTMV5

System timer five. Same as 538 ($21A). Timers three, four, and five all set flags at 554, 556 and 558 ($22A, $22C, $22E), respectively, when they decrement to zero.

546,547 222,223 VVBLKI

VBLANK immediate register. Normally jumps to the stage one VBLANK vector NMI interrupt processor at location 59345 ($E7D1); in the new OS 'B' ROMs; 59310, $E7AE). The NMI status register tests to see if the interrupt was due to a VBI (after testing for a DLI) and, if so, vectors through here to the VBI routine, which may be user-written.

548,549 224,225 VBLANK

VBLANK deferred register; system return from interrupt, initialized to 59710 ($E93E, in the new OS 'B' ROMs; 59653; $E905), the exit for the VBLANK routine. NMI.

550,551 226,227 CDTMA1

System timer one jump address, initialized to 60400 ($EBF0). When locations 536, 537 ($218, $219) reach (count down to) zero, the OS vectors through here (jumps to the location specified by these two addresses). You can set your machine code routine address here for execution when timer one reaches (counts down to) zero. Your code should end with the RTS instruction.

552,553 228,229 CDTMA2

System timer two jump address. Not used by the OS, available to user to enter the address of his or her own routine to JMP to when the timer two (538, 539; $21A, $21B) count reaches zero. Initialized to zero; the address must be user specified. NMI.

554 22A CDTMF3

System timer three flag, set when location 540,541 ($21C, $21D) reaches zero. This register is also used by DOS as a timeout flag.

555 22B SRTIMR

Software repeat timer, controlled by the IRQ device routine. It establishes the initial 1/2 second delay before a key will repeat. Stage two VBLANK establishes the 1/10 second repeat rate, decrements the timer and implements the auto repeat logic.

556 22C CDTMF4

System timer four flag. Set when location 542, 543 ($21E, $21F) counts down to zero.

557 22D INTEMP

Temporary register used by the SETVBL routine at 58460 ($E45C).

558 22E CDTMF5

System timer five flag. Set when location 558, 559 ($22E, $22F) counts down to zero.

559 22F SDMCTL

Direct Memory Access (DMA) enable. POKEing with zero allows you to turn off ANTIC and speed up processing by 30%. Of course, it also means the screen goes blank when ANTIC is turned off! This is useful to speed things up when you are doing a calculation that would take a long time. It is also handy to turn off the screen when loading a drawing, then turning it on when the screen is loaded so that it appears instantly, complete on the screen. To use it you must first PEEK (559) and save the result in order to return your screen to you. Then POKE 559,0 to turn off ANTIC. When you are ready to bring the screen back to life, POKE 559 with the number saved earlier.

560,561 230,231 SDLSTL

Starting address of the display list. The display list is an instruction set to tell ANTIC where the screen data is and how to display it. These locations are the shadow for 54274 and 54275 ($D402, $D403).

562 232 SSKCTL

Serial port control register, shadow for 53775 ($D20F).

564 234 LPENH

Light pen horizontal value: shadow for 54284 ($D40C). Values range from zero to 227.

565 235 LPENV

Light pen vertical value: shadow for 54285 ($D40D).

566,567 236,237 BRKKY

BREAK key interrupt vector. You can use this vector to write your own BREAK key interrupt routine. Initialized to 59220 ($E754).

570 23A CDEVIC

Four-byte command frame buffer (CFB) address for a device -- used by SIO while performing serial I/O, not for user access. CDEVIC is used for the SIO bus ID number. The other three CFB bytes are:

571 23B CCOMND

The SIO bus command code.

572 23C CAUX1

Command auxiliary byte one, loaded from location 778 ($30A) by SIO.

573 23D CAUX2

Command auxiliary byte two, loaded from location 779 ($30B) by SIO.

574 23E TEMP

*Temporary* RAM register for SIO.

575 23F ERRFLG

SIO error flag; any device error except the timeout error (time equals zero).

576 240 DFLAGS

Disk flags read from the first byte of the boot file (sector one) of the disk.

577 241 DBSECT

The number of disk boot sectors read from the first disk record.

578,579 242,243 BOOTAD

The address for where the disk boot loader will be put. The record just read will be moved to the address specified here, followed by the remaining records to be read. Normally, with DOS, this address is 1792 ($700), the value also stored temporarily in RAMLO at 4,5. Address 62189 ($F2ED) is the OS disk boot routine entry point (DOBOOT).

580 244 COLDST

Coldstart flag. Zero is normal; if zero, then pressing RESET will not result in reboot. If POKEd with on (powerup in progress flag), the computer will reboot whenever the RESET key is pressed.

582 246 DSKTIM

Disk time-out register (the address of the OS worst case disk time-out). It is said by many sources to be set to 160 at initialization, which represents a 171 second time-out, but my system shows a value of 224 on initialization. Timer values are 64 seconds for each 60 units of measurement expressed.

583-622 247-26E LINBUF

Forty-byte character line buffer, used to temporarily buffer one physical line of text when the screen editor is moving screen data. The pointer to this buffer is stored in 100,101 ($64,$65) during the routine.

623 26F GPRIOR

Priority selection register, shadow for 53275 ($D01B). Priority options select which screen objects will be 'in front' of others. It also enables you to use all four missiles as a fifth player and allows certain overlapping players to have different colors in the areas of overlap. You add your options up as in location 559, prior to POKEing the total into 623.

Locations 624 to 647 ($270 to $287) are used for game controllers: paddle, joystick and lightpen values.

624 270 PADDL0

The value of paddle 0 (paddles are also called pots, short for potentiometer); PEEK 624 returns a number between zero and 228 ($E4), increasing as the knob is turned counterclockwise.

625 271 PADDL1

This and the next six bytes are the same as 624, but for the other paddles.

632 278 STICK0

The value of joystick 0. STICK registers are shadow locations for PIA locations 54016 and 54017 ($D300,$D301). There are nine possible decimal values (representing 45 degree increments) read by each joystick register (using the STICKn command).


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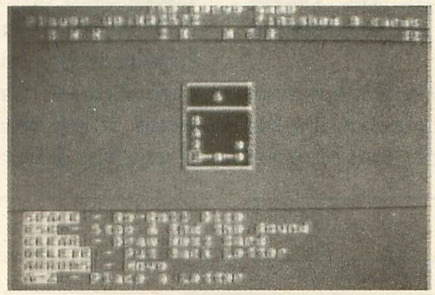
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*Ian Chadwick is a Toronto-based freelance writer.* •

# The Nerve Game

## Countdown on your crossword skills.

**By Jason Strautman**



**Challenge your brain with this tricky BASIC word game requiring speed, spelling skills, and a bit of Nerve. This BASIC program works on 8-bit Atari computers with at least 48K memory and disk drive.**

The object of the Nerve Game is deceptively simple. You must complete eight different word-puzzle cards by placing letters on them to spell words—and do so in the fewest turns. Each player rolls 12 dice, each with one letter per side. Then you place the letters on the cards, completing words in a crossword fashion.

Each player plays the same eight cards in a different order. Spaces that must be filled are represented by a large dot. Spaces that are part of the same word are either touching or connected by a line.

Now for the nerve part of the game: after you complete a card, you have two choices. First, you can just stop your turn. You will be credited with all the cards you finished and you won't have to do those cards over again, no matter what. However, going on means that you risk all the cards you have finished.

If your time runs out before you finish the card you're on, you must re-do *all* the cards that you completed during that round. But since you're playing to see who can finish the cards in the fewest turns, sometimes it's worth the risk.

### GETTING STARTED

Type in Listing One, NERVE.BAS, check it with TYPO II, and SAVE a copy to disk before you RUN it.

When you RUN The Nerve Game you will be asked for the number of players. As few as one person or as many as eight may play. Then you will be asked for the players' names and the number of seconds they will have per turn. Each player can have their own time limit—between 15 and 99 seconds. This gives younger players (and bad typists) a fair chance.

The playing screen shows the player's name at the top, as well as the number of cards the player had finished at the end of the last turn. On the line below that are the available letters (from the dice) and the time remaining. In the center of the screen

is the card. The number on the card is simply a reference number. It has nothing to do with how many cards the player has finished. Then at the bottom of the screen are the commands:

A-Z: Typing a letter will place it on the square where the cursor is, as long as that square currently has a dot and that letter is available from the dice.

[DELETE]: This removes the letter under the cursor and places it back in the dice section.

SPACEBAR: This re-rolls the dice and clears all dice from the card. You are allowed to re-roll as often as you like.

[ARROW KEYS] without [CONTROL]: These move the cursor around the card in the appropriate direction.

[SHIFT] [CLEAR]: Use this key combination to go to the next card without ending your turn. The program checks the card to see if it is complete and then proceeds on to the next card, if there is one.

[ESCAPE] or [RETURN]: The card is checked. If it is complete, the player's turn will be ended and the computer asks if there are any challenges to the words because of misspellings or other errors.

## UNACCEPTABLE WORDS

The computer only checks that each card is complete, not that the words on each card are acceptable. At the end of each turn (when players press [ESCAPE] or [RETURN]) the game then asks if there are any challenges. It is up to the players to check each other's words.

A word is unacceptable if it is hyphenated, a proper noun requiring capitalization, or is not an English word. If any word is not valid, type Y and that player will not be credited with any cards for that turn, and will have to do them all over. Be careful—even if the other player disagrees with your challenge, there's no way to undo a challenge. Once you press Y the turn is lost and the cards have to be redone. If all the words are valid, press any other key to continue.

At the end of each turn, the timer is reset and the same player continues until all eight cards have been filled. Only then does the next player begin. This continues until all of the players have finished.

At the end of the game the scores will be printed (with the place in parentheses). The person who took the least number of turns to finish wins. **A**

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*Jason Strautman lives in San Antonio, Texas. His program* AUTORUN Selector *appeared in the June 1989* ***Antic.***

*Listing on page 40*

# AtariWriter 80

## Ultimate 80-column word processing for 8-bit

### Review by Matthew Ratcliff

At long last **AtariWriter 80** is here. Users of the original AtariWriter or AtariWriter Plus will be instantly familiar with AtariWriter 80. This is the first 80-column word processor direct from Atari for their 8-bit home computers.

AtariWriter 80 costs only $49.95, but that's just the beginning of your start-up investment. You need Atari's $79.95 XEP80 box and a good 80-column composite video monitor—monochrome is preferred and costs about $100. Therefore, adding 80-column word processing to your Atari computer can easily cost more than $200.

## FIRST IMPRESSIONS

The AtariWriter 80 program disk is a flippy. The 48K version is on Side 1, and the 130XE (128K) version is on Side 2. The 130XE version of AtariWriter 80 provides three memory banks of 15872 bytes each, for a total edit buffer size of about 47K. You manage these banks by entering text into one buffer until it is full, or nearly so, and then pressing [START][B] to select the next bank.

When loading a very large document, AtariWriter 80 splits it evenly among the three banks, leaving room in each buffer for the document to grow. The [OPTION][F] command tells AtariWriter 80 to activate its free memory clean-up sequence, which redistributes the file evenly among the 3 buffers. This isn't as elegant as it could be, but is quite workable. Unfortunately, AtariWriter 80 does not use the extra memory of popular third-party 800XL expansions such as the 256K RAMbo XL.

The 98-page manual is well-written and has a complete index. AtariWriter 80 also includes a glossy quick-reference card that is very helpful. It's all that most AtariWriter veterans will need to navigate AtariWriter 80 comfortably.

The usual create, edit, print, and other file support functions are available from AtariWriter 80's main menu. You can also start the spell checker or mail merge utility from this menu. The program disk cannot be write-protected, because it is required for temporary storage in loading the Proofreader or Mail Merge programs.

When editing, the [BREAK] key forces a screen redraw, at which time AtariWriter 80 reformats the screen nicely. But while inserting text, the display is not always updated correctly.

## PROOFREADER

After creating a file, you can verify spelling by selecting the proofreader option from the AtariWriter 80 menu. You are prompted to insert the program disk into drive 1. AtariWriter 80 first writes the document to a temporary file on the program disk, and then loads the Proofreader.

Generally it is unwise to write to your main program disk. However, AtariWriter 80 is not copy-protected. And with a sector copy utility, I had no problems making a backup copy of the master program and dictionary disks. The manual does not mention this, however.

From the Proofreader menu you can chose to correct errors interactively, highlight errors while reviewing the file, or send a list of spelling errors to the printer. Proofreader is capable of adding and saving a user defined personal dictionary. The menu provides options for listing the directory of drive 1 or 2, as well as loading or saving AtariWriter 80 documents for additional spell checking work. When all corrections have been made, control returns to AtariWriter 80 for continued editing of the original document, with spelling changes in place.

## MAIL MERGE

Mail Merge is a nice database facility, geared toward the creation and management of "address books," but easily modified to your individual tastes. Mail Merge presents a menu from which you can choose to create, edit, and manage mailing lists. Multiple mailing list files are simple

to define, each with different field names and sizes.

This miniature database supports a maximum of 15 fields. The field names can have as many as 12 characters, with data fields of 20 characters or less. A total of 255 records fit in one address file.

Mail Merge presents a default record format, quite suitable for almost any address book. Address files are easily updated, cataloged and printed. After creating a satisfactory template, you enter data to fill the records. Save the address book to disk, and it can be merged with AtariWriter 80 documents later.

A Mail Merge file is easily tied into an AtariWriter 80 document to create form letters, or generate customer billing. While you edit, pressing [OPTION][M] tells AtariWriter 80 to insert one of the fields from an address file. This keypress is immediately followed by the desired field number to print in the document.

When printing, AtariWriter 80 prompts for the name of the Mail Merge file from which to import the fields. If the Mail Merge file contains six records the document will be printed six times, using the proper fields from each record for each copy.

## PRINTING

AtariWriter 80 prints documents through the XEP80's printer interface or through a standard Atari printer adapter, such as Atari's 850 interface or ICD's P:R: Connection. When the print command is selected, you specify whether to use the XEP80 or other printer port. No print problems were experienced while printing through the XEP80's interface port. It also works fine with the printer interface of ICD's MIO board.

AtariWriter 80 supports all Atari printers, as well as the Epson FX-80, IDS Microprism 480, and Juki 6100. Pressing [SELECT] while booting AtariWriter 80 brings up the Custom Printer Editor, which lets you create a custom printer driver if your printer has a readable manual.

Out of the box, AtariWriter 80 supports condensed, proportional, and elite type fonts. Up to nine fonts are supported. Some of the additional font selection commands can be used to enable different color printing on an NX1000 Rainbow printer. The Custom Printer Editor does not allow you to load and modify a predefined driver. So, creating an Epson printer driver with the addition of NLQ, italics, and other fonts requires building everything from the ground up. AtariWriter 80 is capable of loading AtariWriter and AtariWriter Plus files with no problems. AtariWriter 80 employs a separate global format menu, just like AtariWriter Plus. After loading an AtariWriter file, the top line of control codes used for global formatting needs to be deleted. No other compatibility problems should occur.

AtariWriter 80 provides an elegant set of block operations. After marking the top of a block of text, the writer moves to the end of the block and selects an option. Commands supported are alphabetize, count words, delete, duplicate, move, or save the block of memory to a file. A block of memory cannot cross a memory bank boundary in the 130XE version. However, AtariWriter 80 will copy or move blocks between different banks of memory.

## NEAR WYSIWYG PREVIEWS

AtariWriter 80's print preview is very nearly a true "what you see is what you get" (WYSIWYG) display. If the document has a second set of margins defined, the XEP80's preview screen indeed shows dual columns simultaneously. If the total page width is 80 columns or less, the document preview will be displayed completely on the XEP80's screen. For wider documents, you must scroll horizontally to view complete lines, as in older versions of AtariWriter.

## SUMMING UP

AtariWriter 80 seems to be a pretty solid product. The only noticeable glitch of AtariWriter 80 is that often, while pressing [CONTROL] [DOWN ARROW] to scroll the display down one line at a time, the display jumps to the end of the document, as if [SELECT] [B] were pressed. This is best avoided by employing the [OPTION] [DOWN ARROW] to move down a page at a time, a reliable function.

While composing this article, I began deleting some characters with [CONTROL] [DELETE]. Garbage started appearing at the bottom of the display, and soon the lower half of the screen was a mess. However, all my display problems cleared up when I shut off the 1040ST system nearby. I suspect the ST was creating some interference with communications between the 800XL and XEP80.

Maybe because I don't do much word processing on the 8-bit any more, it seemed to me that AtariWriter 80 misses keys occasionally. When typing rapidly, a blank space may show up instead of the letter pressed, or letters are missing entirely. The keys on my 800XL are much stiffer than on my PC AT compatible, so the cause could be my lack of regular practice on the 800XL. I also experienced similar problems with Turboword from Micromiser.

AtariWriter 80 is the best 80 column word processor for the 8-bit Atari. Turboword is good, but AtariWriter 80 comes from a rich tradition of superb word processors. It just feels like a solid, tightly integrated product. If you have an XEP80 languishing in the linen closet, get it out, purchase AtariWriter 80, and put it to work. Once you start word processing in 80 columns, you will never want to work with 40 columns again.

ATARIWRITER 80, $49.95.
Atari Corp.
1196 Borregas Avenue
Sunnyvale, CA 94086
(408) 745-2000

# PC Print

Clean printouts from your IBM downloads.

By John West

**Print downloaded IBM format text files easily—without the extra spaces and RETURNs found in standard ASCII files. PC Print replaces the most troublesome control characters even as the file prints. This BASIC program works on all 8-bit Atari computers of any memory size, with disk drive and printer.**

If you use a modem, as I do, then you've probably had to cope with IBM text files at some point. Even some text files for the 8-bit Atari are converted to this standard ASCII format when posted on telecommunications services such as CompuServe and GEnie.

You can download files from other computers (from non-Atari bulletin boards) and use them. But, most text files you download have been written on IBMs, which use CTRL-M and CTRL-J to do the same thing Atari does with a 155.

I've spent many an hour taking out CTRL-M and CTRL-J characters from IBM text files after loading them into a word processor. It seems that almost none of the Atari word processors allow you to globally replace a [RETURN]. (*The First XLEnt Word Processor is one we know of that will replace RETURNs. We always keep a copy handy for just that purpose.*—ANTIC ED)

One time I wrote my own program to simultaneously strip out the CTRL-M's and J's, insert a CHR$(155) and save the file. This takes a lot of time and extra disk space, however. Since all I usually want to do is print the file, I finally created PC Print, a program that replaces the troublesome characters while the file is being sent to the printer.

## GETTING STARTED

Type in Listing 1, PCPRINT.BAS, check it with TYPO II, and SAVE a copy to disk. When you RUN this BASIC program it will create a file named PCPRINT.COM and write it to the disk in drive 1.

Rename this file to AUTORUN.SYS, using Atari DOS selection E. Then when you reboot, PC Print will load and run automatically. (You can also use DOS option L to load PCPRINT.COM, without renaming it.)

If you have an Assembler cartridge, such as MAC/65,you may type in the source code shown in Listing 2 and assemble it. Listing 2 is included primarily for MAC/65 programmers. You do not need to type in Listing 2 to use PC Print.

Then, copy any IBM text file to the printer and it will be converted "on the fly." From DOS, use selection C, and when specifying the destination device use P: to send the file to the printer. For example, type:

D:IBMTEXT.DOC,P: [RETURN].

Press [RESET] to disable this special handler.

## HOW IT WORKS

PC Print takes each byte sent to the printer, checks it and transforms any CTRL-M (13) into a 0, which the printer ignores. Any CTRL-J (10) characters are transformed into an Atari carriage return character (155). Now you can simply copy those IBM ASCII files directly to the printer, without all that annoying double spacing caused by the CTRL-M, CTRL-J sequences.

**Copy a text file to the printer and it will be converted "on the fly."**

This is done by redirecting the printer handler vector in Atari's low memory to our own routine in Page 6. All characters other than the CTRL-M and CTRL-J sequences are passed on to the operating system, which handles the actual printing.

If you don't have a modem, I suggest you get one. It will open a fascinating new world of computing, affording the opportunity to share information with many other Atari and non-Atari computer users. Many popular bulletin board systems, often run by Atari computer clubs, are found all across the US, running on Atari 8-bit machines.

*John West is a Senior at Perquimans County High School, North Carolina. He taught himself BASIC and Assembly, and then learned LOGO, PASCAL, and XLISP by attending summer college programs. This is his first appearance in* **Antic**.

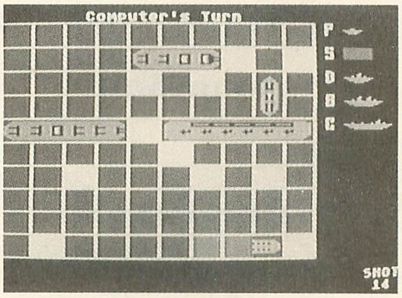
*Listing on page 39*

**SUPER DISK BONUS**

# Naval Battle

*Slick, flashy version of an old favorite.*

***By John Hutchinson and David Rajala***




*Naval Battle*

This issue's super-duper *third* Disk Bonus is Naval Battle, a flashy, colorful version of the classic Battleship game. This BASIC game works on 8-bit Atari computers with at least 48K memory and disk drive. A joystick is required, or two joysticks are optional.

Remember that game you used to play with pencil and paper where you hid a battleship and other seagoing craft on a grid? You and your opponent would take turns firing salvos by calling out coordinates like "A-1" or "G-9," trying intently to find and sink each other's ships. It was fun, but drawing up the grids was often just as difficult as finding someone to play with.

Well, now all you frustrated would-be admirals can experience the thrills of combat on the high seas with Naval Battle. This extra-slick Atari 8-bit version boasts sharp graphics and sounds, complete with the boom of naval artillery and the splash of a watery miss.

The authors of this impressive effort have plenty of military background to draw from. David Rajala is a retired military officer, currently working as a defense analyst in Washington, D.C. Major John Hutchinson is an Operations Research-Systems Analyst for the Army.

## GETTING STARTED

The entire back side of the Antic Monthly Disk has been used for Naval Battle, which will boot automatically. Just put the Antic Disk in drive one with side B up (label side down). Turn the computer off and then on again with BASIC (XL/XE owners don't hold down [OPTION]) and the game loads and runs automatically.

You can try your skill against a computer opponent, compete with another human player, or just sit back and watch the computer play both roles all by itself. There is even a choice of difficulty levels for handicapping young or inexperienced players.

Use your joystick to select from the game options. Press the [SPACEBAR] to pause the game or then resume. Press [ESCAPE] or [RESET] to end the game in progress.

## PLAY OPTIONS

DEMO MODE pits the computer against itself. To join in the action yourself, choose 1 PLAYER mode to compete against the computer, or 2

PLAYER to play against another human.

In two-player mode you have the further option of using two joysticks, or sharing a single stick. The computer hides the ships for both players, so you don't have to worry about accidentally seeing the other player's layout. Players also get to choose different difficulty levels.

The three difficulty levels range from ENSIGN, the easiest, to CAPTAIN and ADMIRAL. As the level increases, the human player is allowed less time to place shots—and the computer uses more artificial logic in planning its shots. If you beat the computer consistently at ADMIRAL level you should join the Navy. Your country needs you!

Other options let you choose between playing with sound effects or without. If you would rather fight your battle in relative silence you will considerably speed up the process as well.

## SHIP PLACEMENT

In single player mode you can place your ships yourself, using the joystick, or let the computer do it. Your fleet consists of five ships of varying lengths—an Aircraft Carrier (5 squares), a Battleship (4 squares), a Destroyer (3 squares), a Submarine (3 squares) and a PT Boat (2 squares). These ships are all drawn in detail—you can even see the tiny planes on the deck of the carrier.

You can place each ship either horizontally or vertically by positioning a flashing cursor on the game grid and pressing the joystick trigger. Once all your ships are positioned, the computer asks if the placement is okay, giving you a chance to re-position your ships.

## PLAYING NAVAL BATTLE

Player number one (or the human player in a one-player game) always goes first. Using your joystick, move the flashing cursor across your opponent's green game grid. Select a position where you think he might have hidden a ship and press the joystick button. You'll hear the sound of a naval gun being fired, followed by either a splash if you missed or explosion if you scored a hit. The game grid will display a white square for a miss. A red square indicates a hit.

**Experience combat complete with the boom of artillery and the splash of a watery miss.**

If you hit a ship, one segment of the appropriate ship on the Hit Indicator will also turn red. The Hit Indicator shows you how many sections of the ship have been hit, but not which ones. You'll have to figure that out by trial and error.

Then your opponent takes his turn. If you are playing against the computer, your ships will remain visible on the blue game grid. If you are playing a two player game, both opponent's ships will remain hidden from view. You and your opponent will continue to take turns until the game ends.

The first player to sink all of his opponent's ships is the winner. The computer will then briefly display the winner's ship placement so the loser can see how close his shots were. You can then either change your game options, or start another exciting naval encounter with the same settings.

## STRATEGY TIPS

When playing Naval Battle you want to maximize the effectiveness of your shots. One of the best strategies is to first go after your opponent's largest remaining ship, selecting grid squares where the ship could fit both vertically and horizontally. You can also stagger your shots in a checkerboard pattern. Try to avoid placing two shots side-by-side. This way you can logically eliminate squares where your opponent's ships cannot possibly fit, without having to actually waste a shot on them.

Your computer opponent uses this strategy to find the most logical hiding spots for your ships. A series of "artificial logic" routines help simulate the human decision making process.

The computer will vary its ship placement each game and may even place its ships side-by-side in an attempt to fool you. The computer should prove a worthy opponent, but it is certainly not infallible. Follow its lead and use logic in placing your shots, and you should be able to beat it.

Your Antic Disk—featuring Naval Battle plus two additional Super Disk Bonuses as well as every type-in program from this issue—will be shipped to you within 24 hours after receiving your order. Just phone Toll-Free to the Antic Disk Desk at **(800) 234-7001**. The monthly disk is only $5.95 (plus $2 for shipping and handling) on your Visa or MasterCard. Or mail a $5.95 check (plus $2 shipping and handling) to Antic Disk Desk, 544 Second Street, San Francisco, CA 94107. ▲

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# Broadcast Automating Atari

## Programming WIMA with a 130XE.

**By Mark Gierhart**

As a result of network programming changes, management at radio station WIMA in Lima, Ohio presented our engineering department with a real challenge. We needed to resurrect our old automation system so it could handle local programming for six hours every night. And it had to be on-line in two to three months! The engineering department consists of only two full-time engineers, Dick Knowles and myself, which meant we had our work cut out for us.

As the first step, we examined our options. We could repair the outdated system which had last been in use several years ago, or we could design and construct our own system using the salvageable parts from the old automation unit. Either way, the time constraints would make it a difficult job.




*Mark Gierhart with his Automate manual in front of the audio and switching circuitry at WIMA radio.*

After analyzing the existing system we determined that many of the control parts which needed repair were either no longer available or difficult to come by at best, and the time required to get the parts available would put us over our deadline. This left us only one option, designing a new system.

With the choice made clear, our task was still no easier than before. We needed to find a "brain" or controller for our system, and it had to meet several criteria. It had to be easy to use, reliable, and most important, cost-effective. This brain had to control several music tape decks, commercial carousel decks, voice tape decks and satellite network news feeds, all with little or no outside operator assistance.

The system would require some type of microprocessor controller to allow storage of program events and time schedules. Having had previous experience with the Atari 8-bit computer's capabilities, we elected to go with an Atari 130XE computer as the main brain of our automation system.

### 130XE BRAIN

The Atari 130XE had all the features we needed for the project, including the low price tag. To complete the system, a disk drive, printer and several cartridges were included in our purchase.

At this point we were ready to start working towards our goal, building our broadcast automation system using our 8-bit computer. My task was to write the software and design the

computer interfacing to accommodate Dick's audio and switching designs.

Having done some programming in BASIC XE from ICD/OSS, I decided that would be the language to use for my automation program. BASIC XE gave me several powerful features I wanted, including the EXTEND command (which uses the 130's extra RAM), the FAST command (which speeds up the BASIC), and several variable functions which standard Atari BASIC doesn't allow.

I also needed the ability to access the clock output functions of the Atari 130XE, giving the program accurate time and date commands. I decided to try ICD's R-Time 8 module. With ICD SpartaDOS I now had access to both the time and date either formatted or unformatted.

I now started on the programming. First I had to find a way to get complete control over each of the audio sources needed for the system. Being in a somewhat high-noise, high-RF environment, I decided to use the Atari's built-in sound generator, using small, cheaply-constructed tone decoder interfaces.

Using a series of Atari POKE commands, I could produce just about any tone from 100hz to well over 10khz. The computer sends out the given tone, which turns on the tone decoder, closing its relay contacts to start, stop, or perform any other specified function on the tape machines. Thanks to the Atari's fine four-channel audio sound system, I was now able to control any outside source.

Now I needed a reliable means of interfacing the Atari with the outside world. I elected to use the Atari's paddle (joystick) ports. These ports have an internal voltage divider circuit which gives the computer a number values that vary with any change in voltage into the port. By placing a different resistance in each line of the interface, and using the PADDLE(x) command, I was able to distinguish each individual signal coming from the tape machines.

## SOFTWARE

Once the interfacing was complete it was time to sit down and write the program. The program, which I call AUTOMATE, is completely menu-driven. Some of the special features of the program include an auto start/stop mode, print to screen/printer mode, and an enlarged print mode. Also, all of the Atari's special function keys were incorporated into the program for ease of operation.

The R-Time 8 module functions were used constantly throughout the program. The Atari 130XE with this module is responsible for airing a network satellite news feed at the top of each hour. Also, this module makes automatic starting and stopping of the system at any given time a reality.

Another special feature of the program was the enlarged print mode. By pressing a single key while in the menu, the operator could bring up a Graphics 17 screen, enlarging all the menu text. I included this option in the software to aid a vision-impaired person working here at the station.

After about a month and a half of "late night" programming I was ready to hook AUTOMATE into the rest of the automation system. Dick had a well-designed audio/switching system ready and waiting for the program's completion.

Within a week, we had both the Atari 130XE and the audio/switching system up and running. To actually see the computer stepping through and playing each programmed event was a dream come true. The hard work and many long hours had paid off.

Future plans under consideration include interfacing the automation system with our accounting and billing department. This will allow direct billing and monitoring of the station's commercial inventory. The station already uses an Atari for inventory, word processing and scheduling. ▲

# Antic Numerologist

*See how your name and dates add up.*

***By Clifton Oyamot***

Once again ancient mysticism meets modern science, this time in the form of your Atari Numerologist, this issue's *second* Super Disk Bonus. This extra-long BASIC program can be found on your monthly Antic Disk, ready to RUN. Programmer Clifton Oyamot is a 17-year-old senior at Rancho High School in Las Vegas, Nevada. This is his first appearance in Antic.

Numerology, in its present form, can trace its origins to the 6th century B.C. and to the great mathematician Pythagoras. Numerologists contend that all things can be reduced to numbers, and understood from there. This applies particularly well to names and dates. By analyzing the numbers in your name and birthdate, a supposedly accurate personal portrait can painted.

Numerology can be seen as a sort of mathematical astrology. If you believe astrology is a waste of time, you won't feel much differently about Antic Numerologist. We are presenting this program strictly for its entertainment value. However, it occasionally does seem to come up with some interesting insights. (See box.)

When you run Antic Numerologist, you are presented with two choices, Name and Date. Name gives you an analysis of your character. The prompts ask for your first, middle, and last names. Omit titles and such like Jr. or III, spaces, and other non-letter characters which may occur. Combine separate names into one word (e.g. Maryann). If you lack a middle name, just enter a space.

You are then asked for your birthdate. Enter your birth month in numerical form (January = 1, etc.). Also, enter the full year, not the two-digit abbreviation.

After all the information has been entered, your Atari will make the necessary calculations, which can become tedious and involved when done by hand. Finally, the Atari interprets the results for you, displaying the interpretation on screen. If you like, you can then print the re-

## Gems from the Antic Numerologist

**Richard Milhous Nixon, 1/9/1913**

When denied your wishes, you may scheme to get your ways. Despite this, your natural inclination is to help people. . . .If not careful, however, you can lead a life of disappointments and depression.

**George Washington, 2/22/1732**

You are the pioneer, the leader, the captain. You are highly original and creative and you possess the drive to put your ideas into practice. You are highly ambitious.

**Ronald Wilson Reagan, 2/6/1911**

You are naturally friendly and sociable. You also have a need to fix things when they are not quite perfect. Peace and quiet are what you yearn for. . . You try to maintain harmony. Without being aggressive, you are still able to gather all that you need, including many friends.

sults on an Epson-compatible printer.

## YOUR ANALYSIS

The analysis is broken into four areas. The Soul Urge describes the motives that underlay your actions in life. The Quiescent Self is what you do or think about when alone. Your Expression is how you appear to the outside world and, quite appropriately, how you express yourself. Finally, your Life Path tells of your purpose in life. If you wish to have a hard copy of the results, press [p] at the prompt.

The second, and more pedestrian, option, Date, is more like a horoscope. Antic Numerologist will ask for your birthdate and for the present date. From there, it will give you a forecast for the year, month, or day, whichever you choose. The message divined should be interpreted according to the particular time frame, whether long-term or short-term.

The Atari Numerologist is by no means omnipotent, but coupled with its calculation power and the cleverly general and flattering responses, you sometimes might find yourself amazed by the program's accuracy. Have fun delving into the psyche of friends and family and perhaps even gain a few valuable insights into those around you.





# Chemistry Tutor

*Learn your ions, stoichiometry and balanced equations.*

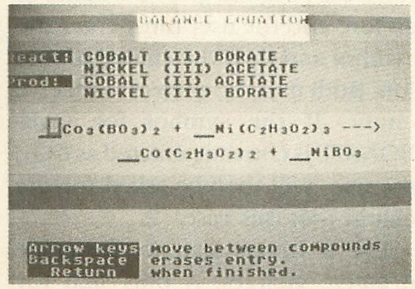
***By John Kennedy***

In the April, 1989 issue of **Antic** we printed *Periodic Madness*, which drilled students about chemical elements, their symbols and atomic masses as shown on the Periodic Table of the Elements. Now, John Kennedy's Chemistry Tutor takes students several steps further, into the realm of ions, stoichiometry and balanced equations.

Chemistry Tutor is a BASIC program, but far too long for a type-in. The program can easily be RUN straight from the **Antic** Monthly Disk—just press the number to the right of CHEMTUTR.BAS on the menu, and press [RETURN]. Your tutor will LOAD and RUN right away.

However, actually using the tutor won't be so easy, unless you already have a basic understanding of beginning chemistry and stoichiometry (proportional weights and measures involved in chemical activity,) and hence the science of balancing equations.

Author John Kennedy teaches Chemistry, Physics and Computer Programming at Northwestern High School near Springfield, Ohio. He developed the Chemistry Tutor to help his beginning chemistry students who had trouble writing and balancing equations and solving mass-mass problems. He says, "I wanted the program to provide a variety of questions and respond to in-




*Balancing an equation*

correct answers with helpful suggestions. The program also had to be easy to use, even by students with little experience with computers." Thanks to the 8-bit Atari's graphics, the resulting program was both educational and colorful.

## USING THE PROGRAM

After the title screen, a menu displays the following choices: Name Ions, Write Symbols and Charges for Ions, Write Chemical Formulas, Write Chemical Equations, Stoichiometric Calculations, and End Program. Pressing the [OPTION] key cycles through the choices. When the pointer is at the desired choice, press the [SELECT] key.

The first three choices each give a sequence of 10 questions, displaying a running total of right and wrong answers. Name Ions gives the ion's symbol and charge, and the user must name the ion. For example, the symbol $ClO_3$ (charge -1) must be identified as CHLORATE.

The program uses the Stock system, in which elements with more than one positive oxidation state are identified by Roman numerals. For example, iron with a +2 oxidation number would be designated as Iron (II). Leave a space between the name and the parenthesis. If an incorrect answer is entered when naming or writing symbols for ions, the correct answer is displayed in the error window and your score is shown.

In Write Symbols and Charges for Ions, the program gives the name of an ion, and the user must enter the symbol and then the charge of that ion. Both must be correct to receive credit. If the symbol for CARBONATE is correctly entered as $CO_3$, the user will then be asked for the charge—in this case, -2.

Use a minus sign to designate negative charges. A plus sign for positive charges is optional. For this section, all numbers typed will appear as subscripts. Letters will be in lower case, with the [SHIFT] key used to produce capitals—the abbreviations of the elements must be correctly capitalized.

## FORMULAS & EQUATIONS

The three options on balancing equations and stoichiometry give one question at a time. Once a question has been completed, the program asks if you want to do another.

When the Write Chemical Formulas or the Write Chemical Equations options are selected, you will be asked to write the formulas for chemical compounds such as LITHIUM CYANATE (LiOCN)—or to give the name from the formula.

Names for compounds are generated randomly from positive and negative ions. No spaces should be used when writing formulas. When an incorrect formula is entered, a hint will be displayed in the error window. After three unsuccessful attempts, the correct answer is displayed.

If you are writing equations, you will enter the formulas for two reactants and two products. When the complete equation is in the display window, a cursor will appear in front of the first compound. Typing numbers will produce standard numerals as coefficients. Use the [ARROW KEYS] to move from one compound to another until the equation is balanced. If you leave a blank space in front of any compound, it will be interpreted as a number 1.

If the equation is not balanced, a help screen will be shown in the information window. This screen displays the number of each ion as a reactant and as a product and if the two are in balance. Each time a coefficient is changed the display is updated. When the display shows a YES for each product and reactant, the equation is balanced. The coefficients must be reduced to their least possible values (like fractions) to be correct.

Stoichiometric Calculations first requires that an equation be written and balanced. A mass for one compound is given and you are asked for the required or produced mass of another. Entering an incorrect answer will begin a tutorial which leads step by step to the correct answer.

## PROGRAM TAKE-APART

Information about positive and negative ions is stored in DATA statements in lines 100-910. Each statement consists of the ion name, symbol, oxidation number, a one (1) for a polyatomic ion or a zero (0) for a monatomic ion, and the atomic weight.

The variables NN and NP are initialized in line 45 to the number of negative and positive ions. By altering these numbers, the user may select only a part of the ion list.

Display list interrupts, initialized in lines 10000-11100, are used to produce a multicolored Graphics 0 screen divided into four windows: green for information, yellow for display, red for error messages, and green for input. Players are used throughout the program to add color by overlaying titles. Players are also used as cursors. Two important machine language routines are MOVE$ and ZERO$ in lines 50 and 60. These are used to position players by moving and erasing blocks of memory.

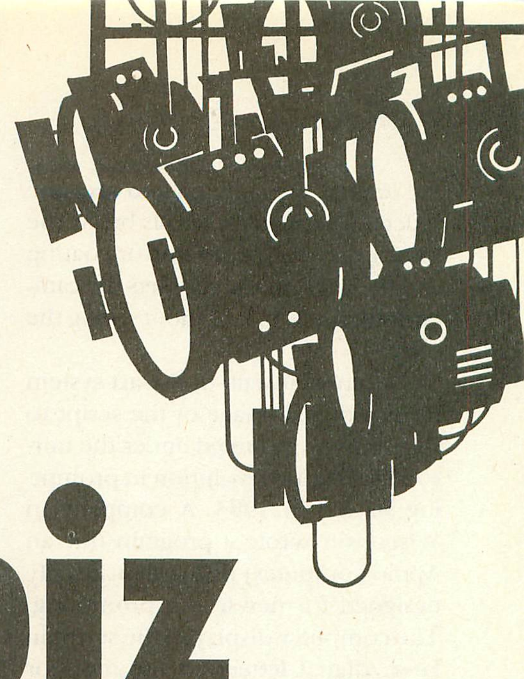
A special character set is used to display subscripts. In this character set, the numerals 0-9 are redefined as subscripts and the control characters having ATASCII values 0-9 are the standard numerals. Lines 75 and 80 first move the character set from ROM and then make these changes.

## HELPFUL TUTOR

Although the author has used this Chemistry Tutor for classroom instruction, he finds it is most valuable as a "tutor," working with individual students.

 ▲





# Showbiz 8-Bit

## Pro teleprompting with his Ataris. By Japji Singh Khalsa.

One day on the video set. . .

"Hold it! Cut!. . . That just isn't going to work!" the director says with an edge of irritation.

I sense a change coming.

"We can't use 'Good Evening'—they may be seeing this video in the morning."

Rough start. I go into edit mode.

"Okay, let's say 'Good day'. . . no. . . 'Hello'. . . no that's too formal. . . Nancy, what do you think?"

The scriptwriter thoughtfully chews on her pencil for a moment, "How about 'Hi'?"

I liked 'Hi' so I make the change, trying to stay one step ahead of the game.

The director thinks out loud, "Hi?. . .hmmm. . . yes, yes, that has some potential. Okay. . . PROMPTER! we want to change. . ."

I cut him off, "Already done."

"Great!" he says. I'm sure he must be thinking "Boy, is this guy good"

Good? Yes. But that's mostly thanks to the "state of the art" teleprompter that I'm using. And at the heart of this system is an Atari 130XE 8-bit computer.

But let me backtrack just a moment because some people don't even know what a teleprompter is. A prompter is a system by which the actor—or in official film/video lingo, the "talent" — can actually read his script while pretending to have memorized it, looking straight at the camera.

The oldest form of a prompter, to my limited knowledge, was a big piece of white cardboard called a cue card. It was cumbersome and clunky and it was difficult to make changes. Also, most often you'd be able to see that the talent was looking off to the side of the camera reading cue cards.

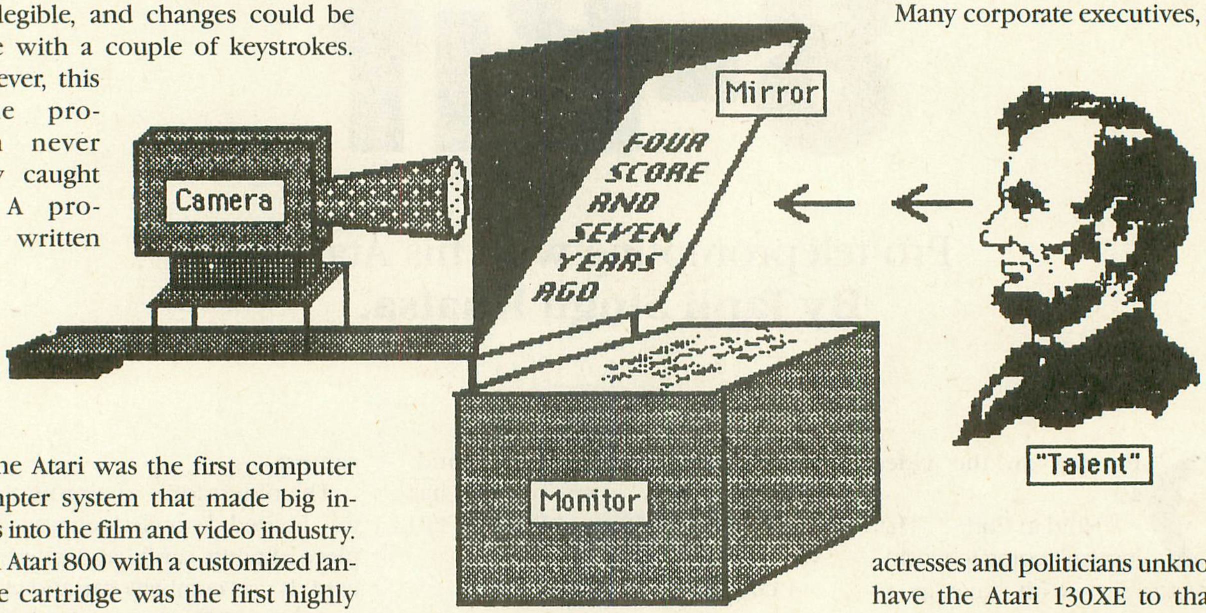
Eventually someone invented a system with a one-way mirror, where a piece of optical-quality glass with a special mirror-like coating is mounted at a 45-degree angle in front of the camera lens. Mounted underneath the mirror would be either an acetate scroll with the script written on it, or a video monitor displaying the script text.

The talent looks at the glass (into

the lens of the camera) and sees the reflected script as it scrolls by. At the same time, the special mirror coating and the angle of the glass lets the camera look through it without seeing the script.

The current state-of-the-art system feeds a digital image of the script to the monitor mounted under the mirror. The digital revolution in prompting started in 1983. A company in Wisconsin wrote a program (for an Apple computer) that was primarily designed for newsroom prompting. The computer displayed the script in large, digital letters on the monitor under the two-way mirror.

The computer offered several advantages over the old systems. It was absolutely silent, the letters were large and legible, and changes could be made with a couple of keystrokes. However, this Apple program never really caught on. A program written for the Atari was the first computer prompter system that made big inroads into the film and video industry.




An Atari 800 with a customized language cartridge was the first highly successful computer prompter. The Atari offered many advantages over other systems. Its built-in graphics abilities made it easier to get color, different font sizes, and most important, a smooth scroll—allowing the letters of the script to flow smoothly up and down the screen without any jerking or jumping.

The Atari also had a built-in NTSC video port, so it could feed the image to the video monitor without adding expensive video cards or other interfaces. Using a different computer would have required complex programming and most likely would have required expensive hardware changes.

My San Francisco company, Magic Teleprompting, currently has three of these Atari-based teleprompters. Each unit consists of a 130XE, a 1050 disk drive, a color video monitor and a special hand controller that connects to the joystick port. The prompter software itself is a proprietary program sold by Lynn Greenberg of Electronic Teleprompting in Newhall, California. One of my systems includes an Epson printer connected through an 850 interface.

We send prompters up and down the West Coast, each system packaged tightly in shipping-quality, professional cases. Open the case, plug it in, boot up, and it's ready to prompt.

I also have a system set up in my office for entering scripts that are delivered to me before the shoot day. I can either type the script directly into the Atari, or, more and more frequently, the client delivers me a disk with the script on it. The disk is usually in either IBM or Macintosh format. In these cases, I read the file into my Macintosh SE, massage it by taking out any strange characters, and then transfer it to the Atari.

I do the transfer with a null modem adaptor connected from the Mac to an 850 interface. On the Mac I use Red Ryder 10.3 and on the Atari I use Backtalk 1.2 from the Antic Arcade Catalog. By utilizing the XMODEM transfer protocol, I can make errorless 2400 baud transfers.

The Atari system has proven to be quite dependable. Shipped by air freight all along the West Coast, these computers have been through rain, sleet and snow — and they've been dropped, dragged, or bounced onto the film set. I had to have a disk drive aligned once, so I sent it to the Computer Support company in South San Francisco. It's worked fine ever since.

Many corporate executives, actors, actresses and politicians unknowingly have the Atari 130XE to thank for making their lines and speeches easier and more comfortable to present.

And we at Magic Teleprompting have the 130XE to thank for making us the biggest and most successful prompter service in Northern California.

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*Japji Singh Khalsa has been working in the film/video business for over 13 years and is owner of Magic Teleprompting in San Francisco. When not on the film set, he likes to golf, play with his new son, or play fantasy role-playing games.*

# SOFTWARE LIBRARY

## TYPING SPECIAL ATARI CHARACTERS

The Atari Special Characters and the keys you must type in order to get them are shown below:

For [CONTROL] key combination, *hold down* [CONTROL] while pressing the next key. For inverse [CONTROL] [A] through [CONTROL] [Z], press the [◪] key—or [人] on the 400/800—then *release* it before pressing the next key. (Press [◪] or [人] again to turn off inverse.) For [ESC] key combinations, press [ESC] and then *release* it before pressing the next key.

Carefully study the chart above and pay close attention to differences between lookalike characters such as the slash key's [/] and the [CONTROL] [F] symbol [◪].

**NORMAL VIDEO**

| FOR THIS | TYPE THIS | FOR THIS | TYPE THIS |
|---|---|---|---|
| ♥ | CTRL , | | CTRL S |
| | CTRL A | | CTRL T |
| | CTRL B | | CTRL U |
| | CTRL C | | CTRL V |
| | CTRL D | | CTRL W |
| | CTRL E | | CTRL X |
| | CTRL F | | CTRL Y |
| | CTRL G | | CTRL Z |
| | CTRL H | | ESC ESC |
| | CTRL I | | ESC CTRL − |
| | CTRL J | | ESC CTRL = |
| | CTRL K | | ESC CTRL + |
| | CTRL L | | ESC CTRL * |
| | CTRL M | | CTRL . |
| | CTRL N | | CTRL ; |
| | CTRL O | | SHIFT = |
| | CTRL P | | ESC SHIFT CLEAR |
| | CTRL Q | | ESC DELETE |
| | CTRL R | | ESC TAB |

**INVERSE VIDEO**

| FOR THIS | TYPE THIS |
|---|---|
| | ESC SHIFT DELETE |
| | ESC SHIFT INSERT |
| | ESC CTRL TAB |
| | ESC SHIFT TAB |
| | 人 CTRL . |
| | 人 CTRL ; |
| | 人 SHIFT = |
| | ESC CTRL 2 |
| | ESC CTRL DELETE |
| | ESC CTRL INSERT |

## TYPO II AUTOMATIC PROOFREADER

TYPO II automatically proofreads **Antic**'s type-in BASIC listings. Type in the listing below and SAVE a copy to disk or cassette. Now type GOTO 32000. At the prompt, type in a single program line **without the two-letter TYPO II code at the beginning**. Then press [RETURN].

Your line will reappear at the bottom of the screen. If the TYPO II code does not match the code in the magazine, then you've mistyped your line.

To call back a previously typed line, type [*], then the line number, then [RETURN]. When the completed line appears, press [RETURN] again. This is how TYPO II proofreads itself.

To LIST your program, press [BREAK] and type LIST. To return to TYPO II, type GOTO 32000. To remove TYPO II from your program, type LIST "D:FILENAME",0,31999, then [RETURN], then NEW, then ENTER "D:FILENAME", then [RETURN]. Now you can SAVE or LIST your program to disk or cassette.

Don't type the TYPO II Codes!

```
WB 32000 REM TYPO II BY ANDY BARTON
VM 32010 REM VER. 1.0 FOR ANTIC MAGAZINE
HS 32020 CLR :DIM LINE$(120):CLOSE #2:CLO
   SE #3
BN 32030 OPEN #2,4,0,"E":OPEN #3,5,0,"E"
YC 32040 ? "↰":POSITION 11,1:? "TYPO II"
EM 32050 TRAP 32040:POSITION 2,3:? "Type
   in a program line"
HS 32060 POSITION 1,4:? " ":INPUT #2;LINE
   $:IF LINE$="" THEN POSITION 2,4:LIST B
   :GOTO 32060
XH 32070 IF LINE$(1,1)="*" THEN B=VAL(LIN
   E$(2,LEN(LINE$))):POSITION 2,4:LIST B:
   GOTO 32060
TH 32080 POSITION 2,10:? "CONT"
MF 32090 B=VAL(LINE$):POSITION 1,3:? " ";
NY 32100 POKE 842,13:STOP
CN 32110 POKE 842,12
ET 32120 ? "↰":POSITION 11,1:? "TYPO II"
   ":POSITION 2,15:LIST B
CE 32130 C=0:ANS=C
QR 32140 POSITION 2,16:INPUT #3;LINE$:IF
   LINE$="" THEN ? "LINE ";B;" DELETED":G
   OTO 32050
VU 32150 FOR D=1 TO LEN(LINE$):C=C+1:ANS=
   ANS+(C*ASC(LINE$(D,D))):NEXT D
WJ 32160 CODE=INT(ANS/676)
JW 32170 CODE=ANS-(CODE*676)
EH 32180 HCODE=INT(CODE/26)
BH 32190 LCODE=CODE-(HCODE*26)+65
HB 32200 HCODE=HCODE+65
IE 32210 POSITION 0,16:? CHR$(HCODE);CHR$
   (LCODE)
VG 32220 POSITION 2,13:? "If CODE does no
   t match press RETURN and edit line a
   bove.":GOTO 32050
```

# ULTIMATE CHAOS

*Article on page 14*

Article on page 14

## NEW FUN WITH FRACTALS

### LISTING 1

Don't type the TYPO II Codes!

```
TF 1 REM CHAOS GAME DEMONSTRATION
NU 2 REM BY ROGER A. PRUITT
CJ 3 REM (C) 1989 ANTIC PUBLISHING, INC
ZX 100 GRAPHICS 24:SETCOLOR 2,0,0:SETCOLO
   R 1,0,10:COLOR 1
WN 110 X0=INT(250*RND(0)):Y0=INT(150*RND(
   0))
OG 120 I=INT(3*RND(0)+1)
EW 130 IF I=1 THEN X1=X0/2:Y1=Y0/2
WK 140 IF I=2 THEN X1=(318+X0)/2:Y1=Y0/2
AR 150 IF I=3 THEN X1=(159+X0)/2:Y1=(191+
   Y0)/2
OD 160 PLOT X1,Y1:X0=X1:Y0=Y1
MQ 170 GOTO 120
```

### LISTING 2

```
BN 1000 REM THE ULTIMATE CHAOS GAME!
YM 1001 REM BY ROGER A. PRUITT
TY 1002 REM (C) ANTIC PUBLISHING, INC
UY 1010 GOSUB 28350:GOTO 10000
BH 1030 GRAPHICS 24:SETCOLOR 2,0,0:SETCOL
   OR 1,0,10:COLOR 1
HA 1040 CX=318/2:CY=190/2:DEG :I=1:SIZE=3
   60/P
HP 1050 FOR TH=0 TO 360 STEP SIZE:X=CX+CY
   *SIN(TH):Y=CY-CY*COS(TH)
VL 1060 X(I)=-X+X/S:Y(I)=-Y+Y/S
OH 1070 I=I+1:NEXT TH
SO 1080 X0=INT(320*RND(0)):Y0=INT(192*RND
   (0))
XH 1090 I=INT(P*RND(0)+1)
EK 1100 X1=(X(I)+X0)*S:Y1=(Y(I)+Y0)*S
AM 1110 PLOT X1,Y1:X0=X1:Y0=Y1
VK 1120 IF PEEK(53279)=2 THEN 10000
ZY 1130 IF PEEK(53279)=3 THEN GOSUB 3000
EH 1140 IF PEEK(53279)=5 THEN GOSUB 5000
RV 1160 GOTO 1090
NZ 3000 TRAP 4000:CLOSE #1:OPEN #1,8,0,"P
   :":? #1;CHR$(27);"C";CHR$(0);CHR$(11);
PG 3010 ? #1;CHR$(27);"D";CHR$(8);CHR$(16
   );CHR$(24);CHR$(32);CHR$(40);CHR$(48);
   CHR$(56);CHR$(64);CHR$(72);CHR$(0)
ED 3020 DM=PEEK(88)+PEEK(89)*256
YY 3030 PRINT #1;CHR$(27);"A";CHR$(8)
UD 3100 FOR I=0 TO 23:XX=DM+320*I
GX 3110 A$=CHR$(0):A$(320)=CHR$(0):A$(2)=
   A$
SP 3120 W=USR(ADR(RSD$),XX,ADR(A$)):PRINT
    #1;"■■";CHR$(27);"K";CHR$(64);CHR$(1)
   ;A$:NEXT I:? #1;CHR$(27);"@"
GE 3130 POKE 764,255
AP 3140 RETURN
AT 4000 IF PEEK(53279)=3 THEN TRAP 40000:
   GOTO 3000
OB 4010 GOTO 4000
DP 5000 B$(1)="D:":B$(LEN(B$)+1)=NAME$:B$
   (LEN(B$)+1)=".PIC"
KI 5010 SCREEN=PEEK(88)+256*PEEK(89)
PE 5020 TRAP 5040:CLOSE #2:OPEN #2,IO,0,B
   $
BU 5030 W=USR(ADR(DUMMY$),2,SCREEN,7680):
   CLOSE #2:RETURN
VA 5040 CLOSE #2:TRAP 40000:POP
TR 5050 ? :POSITION 14,12:? "DISK ERROR."
   :FOR X=1 TO 400:NEXT X:GOTO 10000
LN 6000 GRAPHICS 24:SETCOLOR 2,0,0:SETCOL
   OR 1,0,10
YN 6010 GOSUB 5000
VN 6020 IF PEEK(53279)=2 THEN 10000
AB 6030 IF PEEK(53279)=3 THEN GOSUB 3000
QI 6040 GOTO 6020
XE 10000 GRAPHICS 0:POKE 752,1
GA 10010 POSITION 7,2:? "┌━━━━━━━━━━━━━━━━━━━━━━━━━
   ━━━━━━━━━━━┐"
CR 10020 POSITION 7,3:? "|THE ULTIMATE CH
   AOS GAME!|":POSITION 7,4:? "|   by Rog
   er A. Pruitt    |"
MR 10030 POSITION 7,5:? "└━━━━━━━━━━━━━━━━━━━━━━━━━
   ━━━━━━━━━━━┘"
JJ 10040 POSITION 12,8:? "1. Create Chaos
   ."
MW 10050 POSITION 12,10:? "2. Load Pictur
   e."
YU 10060 POSITION 3,13:? "Select option b
   y pressing 1 or 2.";
VE 10070 POKE 764,255:POKE 694,0:POKE 702
   ,64:GET #3,K:IF K<49 OR K>50 THEN 1007
   0
JV 10080 FOR I=0 TO 15:POSITION 2,8:? "■"
   :NEXT I
SR 10090 POSITION 2,8:? "Input picture na
   me";:INPUT NAME$
MI 10100 IF K=50 THEN IO=4:DUMMY$=LDR$:GO
   TO 6000
AJ 10110 IO=8:DUMMY$=SVR$
SZ 10140 TRAP 10140:POSITION 2,10:? "Give
    number of sides of polygon":INPUT P:I
   F P<1 THEN P=1
SF 10145 IF P>10 THEN POSITION 3,11:? "
     ":GOTO 10140
OF 10150 TRAP 10150:POSITION 2,13:? "Give
    scale factor ( >0 TO 1 )":INPUT S
YB 10155 IF (S<=0) OR (S>1) THEN POSITION
    3,14:? "     ":GOTO 10150
WX 10156 TRAP 40000
RK 10160 POKE 752,1:POSITION 6,18:? "To p
   rint press OPTION key."
ZR 10170 POSITION 3,19:? "To save to disk
    press SELECT key."
KU 10180 POSITION 2,20:? "To quit hold ST
   ART and press OPTION."
ZT 10190 POSITION 4,23:? "To create CHAOS
    press START key.";
OW 10200 IF PEEK(53279)=6 THEN GOTO 1030
WS 10210 GOTO 10200
ER 28350 DIM RSD$(103),A$(640),NAME$(8),B
   $(14),SVR$(39),LDR$(39),DUMMY$(39),X(1
   1),Y(11)
IU 28360 RSD$(1)="hh▜Q▜Uh▜P▜Th▜0h▜N)♥▜M▝♥
   ■♥1T▬U▝▨Ti(▜T⊠□fUh◆◤PJ■♥▝♥□U1N*▛Nh◆◤Pt
   HC◤PM▝▨Ni◤▜N⊠□f0▝▨Pi▛▜P▜T⊠□fQ"
YF 28370 RSD$(91)="▨Q▜UfM▨MI(P◤◆"
YV 28380 CLOSE #3:OPEN #3,4,0,"K:"
AM 28400 LDR$="hhh◣◣◣◣◣*)◣↓B▟h↓E▟h↓D▟h↓I▟h
   ↓H▟ Vd◀T■♥◀U◆"
LL 28410 SVR$="hhh◣◣◣◣◣*)▟↓B▟h↓E▟h↓D▟h↓I▟h
   ↓H▟ Vd◀T■♥◀U◆"
EM 28430 RETURN
```

### LISTING 3

```
KI 10 REM LISTING 2 FOR CHAOS.BAS
AC 20 REM BY ROGER PRUITT
GD 30 REM (c) 1985,1988 ANTIC PUBLISHING
EV 40 REM (LINES 10-250 MAY BE USED WITH
   OTHER BASIC LOADERS IN THIS ISSUE.
IJ 50 REM CHANGE LINE 70 AS NECESSARY.)
PR 60 DIM FN$(20),TEMP$(20),AR$(93):DPL=P
   EEK(10592):POKE 10592,255
```

```
WO 70 FN$="D:LINES.LST":REM THIS IS THE N
   AME OF THE DISK FILE TO BE CREATED
RD 80 ? "Disk or Cassette?";:POKE 764,25
   5
PY 90 IF  NOT (PEEK(764)=18 OR PEEK(764)=
   58) THEN 90
TH 100 IF PEEK(764)=18 THEN FN$="C:"
VB 110 POKE 764,255:GRAPHICS 0:? "      AN
   TIC'S GENERIC BASIC LOADER"
MY 120 ? ,"BY CHARLES JACKSON"
KB 130 POKE 10592,DPL:TRAP 200
PU 140 ? :? :? "Creating ";FN$:? "...plea
   se stand by."
LW 150 RESTORE :READ LN:LM=LN:DIM A$(LN):
   C=1
BQ 160 AR$="":READ AR$
YC 170 FOR X=1 TO LEN(AR$) STEP 3:POKE 75
   2,255
DM 180 LM=LM-1:POSITION 10,10:? "(Countdo
   wn...T-";INT(LM/10);")        "
BK 190 A$(C,C)=CHR$(VAL(AR$(X,X+2))):C=C+
   1:NEXT X:GOTO 160
MM 200 IF PEEK(195)=5 THEN ? :? :? "TOO
   MANY DATA LINES!":? "CANNOT CREATE FIL
   E!":END
CM 210 IF C<LN+1 THEN ? :? "TOO FEW DATA
    LINES!":? "CANNOT CREATE FILE!":END
UQ 220 IF FN$="C:" THEN ? :? " Prepare ca
   ssette, press [RETURN]"
AR 230 OPEN #1,8,0,FN$
PV 240 POKE 766,1:? #1;A$;:POKE 766,0
AL 250 CLOSE #1:GRAPHICS 0:? "COMPLETED
   "
HR 1000 DATA 244
AT 1010 DATA 0500560510540480320820830680
   3604004904106103410410413320913321310 4
   133208133212104133207104133
KE 1020 DATA 2061690001332051620001600001
   7721214921402416521210504013321214400 2
   23021323222400820823416000 0
GU 1030 DATA 1620000222141772060421452062
   3222400820824420019200820823702416520 6
   1050081332061440022302070 24
RP 1040 DATA 1652081050011332081332121440
   0223020903415505005605105504803208208 3
   0680360400570490410610341 65
YY 1050 DATA 2091332132302051652052010402
   0817509603415505005605204804803207606 8
   0820360610341041041040100 10
CO 1060 DATA 0100101701690071570660031041
   5706900310415706800310415707300310415 7
   0720030320862281322121600 00
LP 1070 DATA 1322130960341550500560520490
   4803208308608203606103410410410401001 0
   0100101701690111570660031 04
EA 1080 DATA 1570690031041570680031041570
   7300310415707200303208622813221216000 0
   132213096034155
```

# PC PRINT

## CLEAN PRINTOUTS FROM IBM DOWNLOADS

*Article on page 25*

## LISTING 1

Don't type the TYPO II Codes!

```
GU 100 REM ******************
QW 110 REM *    PC PRINT     *
PR 120 REM *  BY JOHN WEST   *
JF 130 REM *     5-24-89     *
HC 140 REM ******************
QW 150 REM
UY 160 REM (C)1989 ANTIC PUBLISHING INC.
RA 170 REM
JZ 180 GRAPHICS 0:SETCOLOR 2,0,15:SETCOLO
   R 1,0,0:POKE 82,0
BY 190 ? :? :? :? :? :? :? :? :? :? "
          PC PRINT "
QX 200 ? "                BY JOHN WEST ":? "
   (C) Antic PUBLISHING INC"
LU 205 POKE 82,8
UG 210 ? :? "PLEASE INSERT THE DISK"
PA 220 ? "YOU WISH TO PLACE"
AH 230 ? "PCPRINT.COM ONTO AND"
MR 240 ? "PRESS ANY KEY..."
UK 250 OPEN #1,4,0,"K:":GET #1,K:CLOSE #1

AF 260 OPEN #1,8,0,"D:PCPRINT.COM"
LT 270 TRAP 500
AJ 280 FOR A=1 TO 116
TJ 290 READ B
PJ 300 TOTAL=TOTAL+B
HS 310 PUT #1,B
CV 320 NEXT A
VX 330 IF TOTAL<>10960 THEN 500
LH 340 CLOSE #1
JD 345 POKE 82,2
MW 350 ? "SUCCESSFUL!":END
BO 500 ? "ERROR IN DATA!"
IK 510 POKE 82,2
LF 520 CLOSE #1
WB 1010 DATA 255,255,0,6,103,6,162,0,189,
   26,3,201,80,240,5,232,232,232,208,244,
   189,27,3,133,203,189,28
HW 1020 DATA 3,133,204,169,64,157,27,3,16
   9,6,157,28,3,160,15,177,203,153,64,6,1
   36
GQ 1030 DATA 192,255,208,246,160,6,169,80
   ,56,233,1,153,64,6,169,6,233,0,153,65,
   6
EW 1040 DATA 96,0,0,0,0,0,0,0,0,0,0,0,0,0
   ,0,0,0,201,13,208,5
WS 1050 DATA 169,0,76,101,6,201,10,240,3,
   76,101,6,169,155,76,101,6,76,203,254,2
   24
DY 1060 DATA 2,225,2,0,6
```

## LISTING 2

```
0100 ;             "PCPRINT"
0110 ;           BY: JOHN WEST
0120 ;              5-24-89
0130 ; (c) 1989, ANTIC PUBLISHING
0140 ;
0150 ;ASM,,#D:PCPRINT.COM
0160 ;
0170 ;SAVE#D:PRINTIBM.M65
0180 ;
0190 ;CHANGE CTRL-M,CTRL-J INTO 155
0200 ;
0210      .OPT NO LIST
0220 ;
0230 ZPAGE = 203
0240 HATABS = 794      ;START OF HNDLER
0250      ;            TABLE
0260      *=  1536
0270 ;
0280 INITIALSTART
0290 ;
0300      LDX #0
0310 ;
0320 FINDP
0330      LDA HATABS,X ;FIND THE
0340      CMP #'P      ;PRINT HANDLER
0350      BEQ CHANGEPUT ;TABLE BY
0360      INX          ;LOOKING FOR
0370      INX          ;THE LETTER 'P'.
0380      INX
0390      BNE FINDP
0400 ;
```

```
0410 CHANGEPUT
0420      LDA HATABS+1,X ;KEEP THE OLD
0430      STA ZPAGE  ;TABLE ADDRESS
0440      LDA HATABS+2,X ;INTO PAGE
0450      STA ZPAGE+1 ;ZERO AND
0460      LDA # <NEWTABLE ;PUT MY
0470      STA HATABS+1,X ;TABLE ADDRSS
0480      LDA # >NEWTABLE ;INTO THE
0490      STA HATABS+2,X ;HNDLER TABLE
0500      LDY #15
0510 ;
0520 MOVELOOP
0530      LDA (ZPAGE),Y ;COPY ALL THE
0540      STA NEWTABLE,Y ;OTHER HNDLER
0550      DEY        ;ADDRESSES INTO
0560      CPY #255   ;MY TABLE, AND
0570      BNE MOVELOOP
0580      LDY #6
0590      LDA # <NEWPUT ;THEN PUT MY
0600      SEC        ;PUT-BYTE
0610      SBC #1     ;ADDRESS IN
0620      STA NEWTABLE,Y ;IT
0630      LDA # >NEWPUT
0640      SBC #0
0650      STA NEWTABLE+1,Y
0660      RTS
0670 ;
0680 ;
0690 NEWTABLE
0700      .WORD 0,0,0
0710 PUTBYTE
0720      .WORD 0,0,0,0,0
0730 ;
0740 ;
0750 NEWPUT
0760      CMP #13    ;CHEK FOR CTRL-M
0770      BNE NOT13  ;IF NOT, CONT
0780      LDA #0     ;IF SO, CHANGE
0790      JMP REALPRINT ;TO 0 AND DONE
0800 NOT13
0810      CMP #10    ;CHEK FOR CTRL-J
0820      BEQ SKIPJMP ;IF SO, NOT DONE
0830      JMP REALPRINT ;IF NOT, DONE
0840 SKIPJMP
0850      LDA #155   ;CHANGE CTRL-J
0860      JMP REALPRINT ;INTO 155
0870 ;
0880 REALPRINT ;     REGULAR ADDRESS
0890      JMP 65227  ;OF PUT-BYTE
0900 ;
0910 ;CAUSE PROGRAM TO START
0920 ;WHEN IT IS LOADED
0930      *= 736
0940      .WORD INITIALSTART
```

# THE NERVE GAME

*Article on page 21*

**COUNTDOWN ON YOUR CROSSWORD SKILLS**

## *LISTING 1*

Don't type the TYPO II Codes!

```
UA 1 REM THE NERVE GAME
DH 2 REM BY JASON STRAUTMAN
SU 3 REM (C)1989, ANTIC PUBLISHING, INC.
KA 10 C0=0:C1=1:C2=2:C8=8:C9=9:C10=10:C12=12:C13=13:C15=15:C16=16:C17=17:C19=19:C20=20:C250=250:C255=255
UY 20 REM        The Nerve Game
PD 30 REM        By Jason Strautman
MC 40 REM        For Antic Publishing
TZ 50 GOSUB 1320:PLAYER=C1:GOSUB 1500
BF 60 REM        Main Loop
ZV 70 CARDNUM=C1
CS 80 GOSUB 1020:GOSUB 1290
TA 90 REM        Re-Draw The Screen
OW 100 TURN(PLAYER)=TURN(PLAYER)+C1
GT 110 ? "■":POSITION C13,C0:? "The Nerve Game":? "Player up:";NAME$(PLAYER*C10-C9,PLAYER*C10)
CF 120 POSITION 23,C1:? "Finished ";ONCARD(PLAYER)-C1;" cards"
KS 130 POSITION C2,C17:? "SPACE - Re-Roll Dice":? "ESC - Stop & End the Round"
RZ 140 ? "CLEAR - Draw Next Card":? "DELETE - Put Back Letter"
QO 150 ? "ARROWS - Move":? "A-Z - Place a Letter"
WH 160 GOSUB 670
TH 170 CARDNUM=ONCARD(PLAYER):GOSUB 940:POKE C20,C0:POKE C19,C0
QC 180 FOR LOOP=C1 TO C2 STEP C0
YI 190 KEY=C0:GOSUB 320
OY 200 IF PEEK(764)<>C255 THEN GET #C1,KEY:KEY=KEY-128*(KEY>128):IF KEY>96 AND KEY<123 THEN KEY=KEY-32
MM 210 POKE 764,C255
KD 220 IF KEY>64 AND KEY<91 THEN GOSUB 390
SA 230 IF (KEY>41 AND KEY<46) OR KEY=61 THEN GOSUB 490
ZA 240 IF KEY=27 THEN 750
ZR 250 IF KEY=32 THEN GOSUB 670
IF 260 IF KEY=125 THEN GOSUB 820
KA 270 IF KEY=126 THEN GOSUB 560
NJ 280 NEXT LOOP
TY 290 PLAYER=PLAYER+C1:IF PLAYER>PLAY THEN 1190
RM 300 GOTO 70
WW 310 REM        Timer Routine
EC 320 TIME=INT((PEEK(C19)*C255+PEEK(C20))/60):IF TIME<>OLDT THEN OLDT=TIME:SOUND C0,100,C10,C15:SOUND C0,C0,C0,C0
YU 330 LEFT=TIME(PLAYER)-TIME:HI=INT(LEFT/10):LO=LEFT-HI*10:POKE SCRMEM,16+HI:POKE SCRMEM+1,16+LO
BK 340 IF TIME<TIME(PLAYER) THEN RETURN
QM 350 ? "■":POKE ENA,C0:POSITION C13,11:? "■TIME IS UP!!!":POSITION C8,C12:? "Starting back at card #";
UY 360 ? ONCARD(PLAYER):POKE 561,INT(DLIST/256):POKE 560,DLIST-PEEK(561)*256:FOR PAUSE=C1 TO C250:NEXT PAUSE
KM 370 GOSUB 1290:POKE 560,0:POKE 561,6:GOTO 100
TU 380 REM        Place A Letter
YU 390 LOCATE X,Y,CHAR:IF CHAR<>148 THEN RETURN
MP 400 MISC$=CHR$(KEY)
IM 410 FOR LETTER=C1 TO C12
BV 420 IF MISC$=DICE$(LETTER,LETTER) THEN 450
TP 430 NEXT LETTER
ZI 440 RETURN
HA 450 POSITION C2*LETTER,C2:? " "
QB 460 DICE$(LETTER,LETTER)=" ":POSITION X,Y:? MISC$;"■";
ZO 470 RETURN
UW 480 REM        Move The Cursor
HK 490 IF KEY=45 AND Y>C9 THEN Y=Y-C1
QO 500 IF KEY=61 AND Y<C12 THEN Y=Y+C1
XL 510 IF KEY=43 AND X>C17 THEN X=X-C2
FE 520 IF KEY=42 AND X<21 THEN X=X+C2
HA 530 POSITION X,Y:? "■■";
ZJ 540 RETURN
QB 550 REM        Remove A Letter
FO 560 LOCATE X,Y,CHAR:CHAR=CHAR-128
OW 570 IF CHAR<65 THEN RETURN
PY 580 FOR RETURN=C1 TO C12
GO 590 IF DICE$(RETURN,RETURN)=" " THEN 620
AY 600 NEXT RETURN
ZE 610 RETURN
KZ 620 DICE$(RETURN,RETURN)=CHR$(CHAR)
DE 630 POSITION C2*RETURN,C2:? CHR$(CHAR)
YG 640 POSITION X,Y:? "■■";
```

```
ZM 650 RETURN
HH 660 REM ████Roll The Dice████
PJ 670 FOR ROLL=C1 TO C12
NV 680 NUM=INT(RND(C0)*98+C1)
UX 690 DICE$(ROLL)=POSS$(NUM,NUM)
LY 700 POSITION C2*ROLL,C2:? DICE$(ROLL)
LY 710 NEXT ROLL
QK 720 GOTO 940
ZJ 730 RETURN
FX 740 REM ████End Of The Round████
WZ 750 GOSUB 810:POKE ENA,C0:POKE 561,INT
   (DLIST/256):POKE 560,DLIST-PEEK(561)*2
   56
SB 760 ? "◘":POSITION C12,C9:? "Any chall
   enges?";:GET #1,KEY:ON KEY=89 OR KEY-3
   2=89 GOTO 100:? "N"
ZB 770 POSITION C10,C13:? "These cards ar
   e okay."
WE 780 FOR PAUSE=C1 TO C250:NEXT PAUSE
MJ 790 LET ONCARD(PLAYER)=CARDNUM:POKE 56
   0,0:POKE 561,6
LN 800 GOTO 100
WP 810 REM ████Draw A New Card████
WD 820 POSITION C2,C15:? "Checking card..
   ."
HN 830 FOR X=C17 TO 21 STEP C2
NM 840 FOR Y=C8 TO C12
RX 850 LOCATE X,Y,CHAR
XN 860 IF CHAR=ASC("●") THEN POSITION C2,
   C15:? "                 ":POSITION X,Y:
   ? "●┼";:GOTO 180
MQ 870 NEXT Y
MI 880 NEXT X
JS 890 POSITION C2,C15:? "
   ":CARDNUM=CARDNUM+C1
PK 900 IF CARDNUM=C9 THEN 1120
LG 910 GOTO 670:GOTO 940
ZJ 920 RETURN
TP 930 REM ████Place a Card On The Screen████
BX 940 CURR=CARDP(PLAYER,CARDNUM):RESTORE
    19950+CURR*50
XO 950 POSITION C16,6:? "┌───────┐":POKE 85
   ,C16:? "┃  ";CURR;"  ┃":POKE 85,C16
PQ 955 ? "├───────┤":POSITION C16,C13:? "└─
   ──────┘"
WS 960 FOR DRAW=C1 TO 4
KM 970 READ MISC$:POSITION C16,C8+DRAW:?
   MISC$
IW 980 NEXT DRAW
UD 990 X=C17:Y=C9:POKE ENA,3:POSITION X,Y
   :? "●┼";
ZZ 1000 RETURN
ZL 1010 REM ████Shuffle The Cards████
KK 1020 FOR SORT=C1 TO C8
EO 1030 NUM=INT(RND(C0)*C8+C1)
MP 1040 IF SORT=C1 THEN 1080
ED 1050 FOR CHECK=C1 TO SORT
JI 1060 IF NUM=CARDP(PLAYER,CHECK) THEN 1
   030
TY 1070 NEXT CHECK
UC 1080 CARDP(PLAYER,SORT)=NUM
CO 1090 NEXT SORT
AB 1100 RETURN
AA 1110 REM ████Out of Cards████
BZ 1120 POKE ENA,C0:? "◘":POKE 561,INT(DL
   IST/256):POKE 560,DLIST-PEEK(561)*256
XV 1130 POSITION C12,C9:? "Any challenges
   ?";:GET #1,KEY:IF KEY=89 OR KEY=122 TH
   EN CARDNUM=ONCARD(PLAYER):GOTO 100
FJ 1140 ? "N":POSITION 6,C13:? "All your
   cards are gone!!!"
FT 1150 FOR PAUSE=C1 TO C250:NEXT PAUSE
CZ 1160 GOSUB 1290
LU 1170 POKE 560,0:POKE 561,6:GOTO 290
QJ 1180 REM ████Must Be End Of Game████
QM 1190 GRAPHICS 0:POKE 710,2:? "Here are
    the scores:":FOR I=C1 TO PLAY:LET ONC
   ARD(I)=C1:FOR J=C1 TO PLAY
IM 1200 IF TURN(I)>TURN(J) THEN LET ONCAR
   D(I)=ONCARD(I)+C1
WD 1210 NEXT J:NEXT I
OQ 1220 FOR I=C1 TO C8
EQ 1230 FOR J=C1 TO PLAY
KS 1240 IF ONCARD(J)=I THEN ? NAME$(J*C10
   -C9,J*C10);" (";ONCARD(J);") ";TURN(J)
   ;" turns"
FT 1250 NEXT J
FL 1260 NEXT I
FM 1270 END
JI 1280 REM ████Reset The Timer████
YH 1290 POKE C20,C0:POKE C19,C0
AF 1300 RETURN
UY 1310 REM ████Initialize████
OP 1320 DIM DICE$(C12),POSS$(98),NAME$(80
   ),MISC$(C10),CARDP(C8,C8),ONCARD(C8),T
   URN(C8),TIME(C8)
NY 1330 OPEN #C1,4,C0,"K:":GRAPHICS C0:SC
   RMEM=PEEK(88)+PEEK(89)*256+117
PV 1340 FOR I=C1 TO C8:LET ONCARD(I)=C1:T
   URN(I)=C0:NEXT I
PZ 1350 POSS$="AAAAAAAAABBCCDDDDEEEEEEEEE
   EEEEFFGGGHHIIIIIIIIIJKLLLLMMNNNNNNOOOOO
   OOOPPQRRRRRRSSSSTTTTTTUUUUVVWWXYYZ"
KJ 1360 POKE 710,146:POKE 709,C12:POKE 82
   ,C2
MV 1370 ? "◘":POSITION C13,C0:? "The Nerv
   e Game":POSITION 11,C1:? "By Jason Str
   autman"
QU 1380 REM ████Get # Of Players And Names████
AE 1390 TRAP 1390:POSITION C2,4:? "How ma
   ny players for this game";:INPUT PLAY:
   PLAY=INT(PLAY)
DR 1400 IF PLAY<C0 OR PLAY>C8 THEN 1390
EE 1410 FOR I=C1 TO PLAY
VY 1420 POSITION C2,5+C2*I:? "Player #";I
   ;"'s name -->";:INPUT #C16,MISC$
IX 1430 TRAP 1430:POSITION C2,6+C2*I:? "
   How many seconds per round";:INPUT AL
   LOT
VO 1440 ON ALLOT<15 OR ALLOT>99 GOTO 1430
   :TIME(I)=ALLOT
KD 1450 IF LEN(MISC$)<C10 THEN FOR J=LEN(
   MISC$)+C1 TO C10:MISC$(J)=" ":NEXT J
ND 1460 NAME$(I*C10-C9)=MISC$
FS 1470 NEXT I
BF 1480 RETURN
ZG 1490 REM ████Player/Missle for Card████
LW 1500 TOP=PEEK(106)-C8:POKE 54279,TOP
ZO 1510 ENA=53277:POKE 559,46:POKE ENA,C0
IN 1520 POKE 53248,114:PLAY0=512
KG 1530 BASE=256*TOP:POKE 53256,C1
PP 1540 POKE 53249,130:POKE 705,80
XM 1550 FOR I=BASE+PLAY0 TO BASE+PLAY0+12
   8:POKE I,C0:NEXT I
OR 1560 POKE 704,80:RESTORE 1600
XY 1570 FOR J=BASE+PLAY0+41 TO BASE+PLAY0
   +70
IB 1580 POKE J,C255:POKE J+128,C255:NEXT
   J
KS 1590 REM ████Set up the Display List████
RH 1600 DLIST=PEEK(560)+PEEK(561)*256:FOR
    I=0 TO 30:POKE 1536+I,PEEK(DLIST+I):N
   EXT I:POKE 560,0:POKE 561,6:DLST=1536
KM 1610 POKE DLST,80:POKE DLST+7,C0:POKE
   DLST+9,C0:POKE DLST+24,C0:POKE DLST+30
   ,C2:POKE DLST+31,C2:POKE DLST+32,65
GP 1620 POKE DLST+33,PEEK(560):POKE DLST+
   34,PEEK(561):POKE DLST+29,2:RETURN
RH 19998 REM ████Data for the Cards████
SG 19999 REM CARD #1
FO 20000 DATA ┃  ●  ┃
BS 20010 DATA ┃●─●─●┃
FW 20020 DATA ┃  ●  ┃
GA 20030 DATA ┃  ●  ┃
QL 20049 REM CARD #2
CI 20050 DATA ┃●─●─●┃
NK 20060 DATA ┃     ┃
CQ 20070 DATA ┃●─●─●┃
NS 20080 DATA ┃     ┃
RW 20099 REM CARD #3
YT 20100 DATA ┃●   ●┃
YX 20110 DATA ┃●   ●┃
ZB 20120 DATA ┃●   ●┃
CD 20130 DATA ┃●─●─●┃
RW 20149 REM CARD #4
CL 20150 DATA ┃●─●─●┃
ZR 20160 DATA ┃●   ●┃
CT 20170 DATA ┃●─●─●┃
NV 20180 DATA ┃     ┃
TH 20199 REM CARD #5
SG 20200 DATA ┃●─●  ┃
MW 20210 DATA ┃     ┃
SO 20220 DATA ┃●─●  ┃
SS 20230 DATA ┃●─●  ┃
TH 20249 REM CARD #6
HM 20250 DATA ┃●    ┃
HQ 20260 DATA ┃●    ┃
ZY 20270 DATA ┃●   ●┃
DA 20280 DATA ┃●─●─●┃
```

```
US 20299 REM CARD #7
YZ 20300 DATA ◫●    ●◫
ZD 20310 DATA ◫●    ●◫
ZH 20320 DATA ◫●    ●◫
ZL 20330 DATA ◫●    ●◫
```

```
US 20349 REM CARD #8
GR 20350 DATA ◫  ●  ◫
CV 20360 DATA ◫●⊟●⊟●◫
GZ 20370 DATA ◫  ●  ◫
OB 20380 DATA ◫     ◫
```

---

# ANTIC SOUND CREATOR

## YOU'LL *SEE* WHY A VIOLIN SOUNDS DIFFERENT FROM A CLARINET

*Article on page 9*

## *LISTING 1*

Don't type the TYPO II Codes!

```
CV 10 REM SOUND CREATOR
QX 20 REM BY JEFFREY SUMMERS
CI 30 REM (C) 1989 ANTIC PUBLISHING
GU 99 GOTO 10000
NK 100 COLOR 1:PLOT 10,30:DRAWTO 111,30:COLOR 2:FOR I=1 TO 100:PLOT 10+I,62-4*WAVE(I):NEXT I:RETURN
YC 1000 GRAPHICS 7:SETCOLOR 4,0,13:COLOR 1
SI 1010 PLOT 10,0:DRAWTO 10,60:PLOT 10,30:DRAWTO 110,30
VO 1015 GOSUB 100
ER 1020 PRINT "Add Harmonic  Play wave  Draw wave"
NW 1025 PRINT "Save wave   Load wave  Clear wave":PRINT "Quantize   Exit"
ZY 1030 OPEN #5,4,0,"K:":GET #5,X:CLOSE #5
XD 1040 IF X=65 THEN 2000
WN 1050 IF X=80 THEN 3000
AF 1060 IF X=68 THEN 4000
ZP 1070 IF X=83 THEN 5000
BK 1080 IF X=76 THEN 6000
CY 1085 IF X=67 THEN 7000
BX 1086 IF X=81 THEN 8000
EF 1087 IF X=69 THEN GRAPHICS 0:GOTO 12000
OP 1090 GOTO 1020
NQ 2000 TRAP 2000:PRINT "Harmonic multiple: ";:INPUT #1,MULT
UP 2010 TRAP 2010:PRINT "Scale factor: ";:INPUT #1,SCALE:TRAP 40000
CX 2020 FOR I=1 TO 100:COLOR 0:PLOT 10+I,62-4*WAVE(I):WAVE(I)=WAVE(I)+SCALE*(SIN(3.6*MULT*I)*7)
GC 2025 IF WAVE(I)>15 THEN WAVE(I)=15
RB 2026 IF WAVE(I)<0 THEN WAVE(I)=0
YW 2030 COLOR 1:PLOT 10+I,30:COLOR 2:PLOT 10+I,62-4*WAVE(I):NEXT I
OB 2040 GOTO 1020
YT 3000 TRAP 3000:PRINT "Frequency (delay): ";:INPUT #1,DELAY
OA 3010 TRAP 40000
GC 3020 FOR I=1 TO 100:WAVE$(I)=CHR$(16+WAVE(I)):NEXT I:D=USR(ADR(PLAY$),DELAY,ADR(WAVE$))
IT 3030 POKE 54272,34:POKE 54286,64
OC 3040 GOTO 1020
ZB 4000 I=1:OPEN #5,4,0,"K:"
DA 4010 COLOR 1:PLOT 10+I,70:DRAWTO 10+I,75
GA 4020 POKE 764,255
YH 4030 IF STICK(0)<>15 THEN 4200
VU 4040 IF PEEK(764)=255 THEN 4030
PC 4050 GET #5,X:IF (X<>42) AND (X<>43) AND (X<>61) AND (X<>45) THEN POKE 764,255:GOTO 4030
MT 4060 IF X=42 THEN COLOR 0:PLOT 10+I,70:DRAWTO 10+I,75:I=I+1:IF I<=100 THEN 4010
NX 4065 IF X=42 THEN CLOSE #5:GOTO 1020
SS 4070 IF X=43 THEN COLOR 0:PLOT 10+I,70:DRAWTO 10+I,75:I=I-1:IF I<1 THEN I=1
YW 4075 IF X=43 THEN 4010
WJ 4080 IF X=45 THEN COLOR 0+(WAVE(I)=0):PLOT 10+I,62-4*WAVE(I):COLOR 2:WAVE(I)=WAVE(I)+0.25
GG 4081 IF WAVE(I)>15 THEN WAVE(I)=15
UB 4082 IF X=45 THEN PLOT 10+I,62-4*WAVE(I):GOTO 4010
CG 4090 COLOR 0+(WAVE(I)=0):PLOT 10+I,62-4*WAVE(I):COLOR 2:WAVE(I)=WAVE(I)-0.25:IF WAVE(I)<0 THEN WAVE(I)=0
AI 4095 PLOT 10+I,62-4*WAVE(I):GOTO 4010
QV 4200 X=STICK(0)
SF 4210 IF X=7 THEN COLOR 0:PLOT 10+I,70:DRAWTO 10+I,75:I=I+1:IF I<=100 THEN 4010
NO 4215 IF X=7 THEN CLOSE #5:GOTO 1020
QC 4220 IF X=11 THEN COLOR 0:PLOT 10+I,70:DRAWTO 10+I,75:I=I-1:IF I<1 THEN I=1
WG 4225 IF X=11 THEN 4010
UF 4230 IF X=14 THEN COLOR 0+(WAVE(I)=0):PLOT 10+I,62-4*WAVE(I):COLOR 2:WAVE(I)=WAVE(I)+0.25
FV 4231 IF WAVE(I)>15 THEN WAVE(I)=15
SJ 4235 IF X=14 THEN PLOT 10+I,62-4*WAVE(I):GOTO 4010
AK 4240 IF X=13 THEN COLOR 0+(WAVE(I)=0):PLOT 10+I,62-4*WAVE(I):COLOR 2:WAVE(I)=WAVE(I)-0.25
QT 4241 IF WAVE(I)<0 THEN WAVE(I)=0
ZX 4245 PLOT 10+I,62-4*WAVE(I):GOTO 4010
SE 5000 PRINT "Filename: ";:INPUT #1,FILE$
WY 5001 IF FILE$(2,2)<>":" AND FILE$(3,3)<>":" THEN F$=FILE$:FILE$="D:":FILE$(3)=F$
RE 5002 TRAP 5900
SI 5010 OPEN #2,8,0,FILE$:FOR I=1 TO 100:PRINT #2;WAVE(I):NEXT I:CLOSE #2:TRAP 40000:GOTO 1020
YI 5900 PRINT "Error in Save":FOR I=1 TO 100:NEXT I:TRAP 40000:GOTO 1020
SF 6000 PRINT "Filename: ";:INPUT #1,FILE$
WZ 6001 IF FILE$(2,2)<>":" AND FILE$(3,3)<>":" THEN F$=FILE$:FILE$="D:":FILE$(3)=F$
RQ 6002 TRAP 6900
OU 6010 OPEN #2,4,0,FILE$:FOR I=1 TO 100:INPUT #2;X:WAVE(I)=X:NEXT I:CLOSE #2:GOSUB 100:TRAP 40000:GOTO 1020
KM 6900 PRINT "Error in Load":FOR I=1 TO 100:NEXT I:TRAP 40000:GOTO 1020
WB 7000 COLOR 0:FOR I=1 TO 100:PLOT 10+I,62-4*WAVE(I):WAVE(I)=8:NEXT I:GOSUB 100:GOTO 1020
FL 8000 FOR I=1 TO 100:COLOR 0:PLOT 10+I,62-4*WAVE(I):COLOR 2:WAVE(I)=INT(WAVE(I)):PLOT 10+I,62-4*WAVE(I):NEXT I
NY 8010 GOTO 1020
YP 9040 D=USR(ADR(PLAY$),15,ADR(WAVE$))
JF 9050 POKE 54272,34:POKE 54286,64
IF 10000 DIM WAVE$(100),PLAY$(57),R$(1),WAVE(100),FILE$(20),F$(20)
KZ 10010 DEG :FOR I=1 TO 57:READ A:PLAY$(I,I)=CHR$(A):NEXT I
ZN 10030 FOR I=1 TO 100:WAVE(I)=8:NEXT I
RW 10040 OPEN #1,4,0,"E:"
UU 10099 GOTO 1000
DU 11000 DATA 104, 104, 104, 133, 212, 104, 133, 215, 104, 133
GB 11010 DATA 214, 169, 0, 141, 8, 210, 141, 14, 212, 141
GM 11020 DATA 0, 212, 141, 47, 2, 160, 0, 177, 214, 141
ZO 11030 DATA 1, 210, 166, 212, 202, 224, 0, 208, 251, 200
IJ 11040 DATA 192, 100, 208, 239, 172, 252, 2, 192, 255, 240
VY 11050 DATA 230, 169, 34, 141, 47, 2, 96
XK 12000 END
```

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